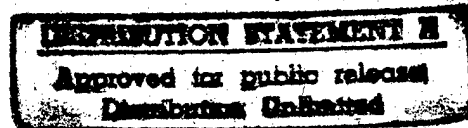


Annual Industrial Capabilities Report
to
Congress



February 1997



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Annual Industrial Capabilities Report to Congress

EXECUTIVE SUMMARY

Section 2504 of Chapter 148, title 10 of the United States Code, as amended by the Fiscal Year 1997 Defense Authorization Act, requires the Secretary of Defense to submit an annual report to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives, by March 1st of each year. The report is to describe relevant internal guidance issued, the methods and analyses used to identify and address industrial capabilities issues, and each action taken to sustain an essential "at risk" industrial capability.

House of Representatives Committee on Appropriations Report 104-617 contains similar requirements.¹ This report also responds to this requirement.

Introduction

The Department has established policies and procedures, performed analyses, and taken the actions necessary to:

- Leverage the capabilities and competitive pressures of the commercial marketplace.
- Identify and evaluate those industrial and technological capabilities needed to meet current and future defense requirements.
- When necessary, determine the most cost- and mission-effective actions that the Department should take to preserve endangered essential capabilities.
- Respond appropriately within the Department's regular budget, acquisition, and logistics processes.

DoD Policy Guidance

The end of the Cold War has brought dramatic changes to DoD's relationship with the national and world economies. With significant changes in military missions and sharp reductions in defense spending, the Department must rely on the broader commercial world, and a reshaped defense industry, to equip its forces. Most defense firms are responding to spending

¹ On page 185 of that report, under the heading *Manufacturing Processes*, the Committee expressed concern that critical defense manufacturing processes and technologies are in danger of being lost as a result of downsizing in the defense industry. The Committee directed the Defense Logistics Agency to identify potential problems affecting the defense supplier base and submit a report to the Committee on its findings.

reductions in predictable ways. They are reducing excess capacity, streamlining processes, and revamping supplier relationships. The sum total of these actions lead to increased efficiencies, reduced defense product costs, and better value for taxpayers. However, these changes also could have important consequences for the Department's ability to meet its future mission requirements. The Department therefore has developed the policies and procedures necessary to make appropriate judgments about industrial issues and to integrate those judgments into its regular budget, acquisition, and logistics processes. Relevant policy guidance issued in 1995 and 1996 includes:

Assessing Essential Capabilities

On April 25, 1996, DoD published Directive 5000.60, "Defense Industrial Capabilities Assessments" and accompanying Handbook 5000.60-H, "Assessing Defense Industrial Capabilities." The documents require DoD Components to validate that specific criteria are met before taking action or making an investment to preserve an industrial capability.

- There is a valid national security requirement for the product or service.
- The capability is truly unique.
- The unique capability is genuinely at risk.
- All feasible alternatives have been evaluated.
- The recommended action is the most cost- and mission-effective.
- The funds and legal authority to make the investment have been identified.

DoD Components are using these guidelines to make appropriate judgments about industrial issues and to integrate those judgments into the regular budget, acquisition, and logistics processes.

Planning Guidance

The Department periodically publishes internal planning guidance reflecting the highest priorities of the Secretary of Defense. The current guidance directs the DoD to rely primarily on available materiel, including war reserve inventories and other existing resources. DoD Components develop industrial preparedness measures to permit accelerated production of munitions, critical troop support items, and spares *where this is a cost-effective alternative*. Given anticipated response times, requirements to "surge" production, and the need to maintain a "domestic mobilization base," are limited. DoD Components, however, do maintain the industrial capability needed to replenish critical munitions, troop support items, and spares consumed during a conflict within a specified period of time after the conflict.

Armaments Cooperation and Foreign Vulnerability

DoD and many friendly governments have established reciprocal procurement agreements that waive their respective "buy national" laws and put each other's industries on par as potential suppliers. On February 24, 1995, the Under Secretary of Defense for Acquisition and Technology issued policy guidance designed to ensure DoD takes full advantage of the benefits

of global competition, consistent with its national security responsibilities. A DoD component may exclude foreign sources from a solicitation for mobilization base reasons only with appropriate approvals.

There are other exceptional conditions—summarized in Section 5.2 of DoD Handbook 5000.60-H, “Assessing Defense Industrial Capabilities”—in which reliance on foreign suppliers may constitute unacceptable foreign vulnerabilities. In such cases, the contracting officer, working in concert with the program manager through the normal contract approval process, may limit procurements to domestic sources.

Acquisition Regulations

On March 15, 1996, as part of its acquisition reform effort, DoD issued updated acquisition policy—DoDD 5000.1, “Defense Acquisition” and DoD Regulation 5000.2-R, “Mandatory Procedures for Major Defense Acquisition Programs and Major Automated Information System Acquisition Programs.” These documents describe a disciplined management approach for acquiring systems and materiel to satisfy valid military needs. Program industrial capability needs are to be met through reliance on a national technology and industrial base sustained primarily by commercial demand, with minimized need for new defense-unique industrial capabilities. Foreign sources and international cooperative developments are to be used where advantageous and within limitations of the law. The program acquisition strategy must analyze the industrial capability required to design, develop, produce, support, and if appropriate, to restart the program. Prior to production termination, DoD Components must take actions to ensure there will be adequate industrial capabilities and capacities to meet post-production operational needs.

Defense Capability Preservation Agreements

On May 13, 1996, the Department amended Part 231 of the Defense Federal Acquisition Supplement, effective immediately, to implement Section 808 of the FY 1996 Defense Authorization Act (Public law 104-106). Section 808 permits the DoD to enter into a defense capability preservation agreement with a defense contractor where it would facilitate the achievement of the policy objectives relating to defense reinvestment, diversification, and conversion set forth in 10 U.S.C. 2501(b). Such an agreement would permit the contractor to claim certain indirect costs, attributable to its private sector work, on its defense contracts.

DoD Assessments, Decisions, and Actions

In 1995 and 1996, the Department and its Components performed a series of sector, subsector, commodity, and product assessments. The Department conducted these assessments to identify those capabilities needed to meet defense requirements and to make informed budget, acquisition, and logistics decisions. In some cases, the assessments addressed areas of interest which cut across Service boundaries. These assessments were performed in a cooperative

manner with the appropriate DoD Components and civil agencies. DoD assessments completed in 1995 and 1996 fall into three categories.

- *Industrial* assessments were conducted to determine whether industrial or technological capabilities associated with an industrial sector, subsector, or commodity important to DoD could be lost.
- *Technology* assessments were conducted to evaluate the extent to which DoD has, or will have, assured and affordable access to selected leading edge technologies needed to meet military requirements.
- *Domestic source restriction* assessments were conducted to determine if those foreign product restrictions contained in the Defense Federal Acquisition Supplement that were imposed by a DoD policy decision, not by statute, still were required for national security reasons.

Additionally, the DoD Components (the Army, Navy, Air Force, and Defense Logistics Agency) conducted their own analyses when (1) there was an indication that industrial or technological capabilities associated with an industrial sector, subsector, or commodity important to a single DoD Component could be lost; or (2) it was necessary to provide industrial capabilities information to help make specific programmatic decisions.

These DoD and DoD Component assessments generally led to similar conclusions. Although the defense industry is experiencing significant reductions and downsizing, DoD found very few cases where essential capabilities are endangered, even given low production rates. In those few cases, the Department is taking steps to assure essential capabilities will continue to be available.

Generally, DoD intervention actions have been limited to preserving selected capabilities for which DoD peacetime requirements are limited, and projected military contingency requirements are significantly larger. In such cases, DoD has restricted competition in a solicitation, for mobilization base reasons, to domestic sources and/or acquired and maintained facilities, equipment, or components needed to meet projected military contingency (surge and replenishment) requirements.

1. Annual Report Requirements

Section 2504 of Chapter 148, title 10 of the United States Code, as amended by the Fiscal Year 1997 Defense Authorization Act, requires the Secretary of Defense to submit an annual report to the Committee on Armed Services of the Senate and the Committee on National Security of the House of Representatives, by March 1st of each year. The report is to include descriptions of:

- Department of Defense (DoD) industrial and technological guidance issued to facilitate the attainment of national security objectives, including that providing for the integration of industrial and technological capabilities considerations into its budget allocation, weapons acquisition, and logistics support decision processes.
- Methods and analyses undertaken by the DoD, or in cooperation with other Federal agencies, to identify and address industrial and technological capabilities concerns.
- Selected industrial and technological capabilities assessments prepared pursuant to Section 2505 of Chapter 148, and other analyses used in developing the DoD's budget submission for the next fiscal year, including a determination as to whether identified instances of foreign dependency adversely impact warfighting superiority.
- DoD programs and actions designed to sustain specific essential technological and industrial capabilities.

House of Representatives Committee on Appropriations Report 104-617 contains similar requirements. On page 185 of that report, under the heading *Manufacturing Processes*, the Committee expressed concern that critical defense manufacturing processes and technologies are in danger of being lost as a result of downsizing in the defense industry. The Committee directed the Defense Logistics Agency to identify potential problems affecting the defense supplier base and submit a report to the Committee on its findings.

This report represents the Department's response to both requirements.

2. DoD Policy Guidance

2.1 Introduction

The end of the Cold War has brought dramatic changes to DoD's relationship with the national and world economies. With significant changes in military missions and sharp reductions in defense spending, the Department of Defense must rely on the broader commercial world, and a reshaped defense industry, to equip its forces.

DoD buys products and services—not industrial capabilities. However, every product or service represents a set of industrial capabilities. A defense industrial capability is a skill, facility, process, or technology needed to design, develop, produce, repair, or maintain products used by the DoD. During the Cold War, DoD developed leading-edge technologies and industrial capabilities to meet unique requirements. Any commercial applications were incidental to meeting national security needs. Today, the Department finds itself in a new environment. First, DoD budgets have declined dramatically in recent years while the global economy continues to grow. Second, many leading-edge technologies that will be critical to success on future battlefields (for example, electronics, computers, information processing, and communications) come from the commercial sectors of the economy.

As a result, the Department can no longer afford to rely solely upon defense-unique industrial capabilities. To continue to provide U.S. armed forces with the most technologically advanced systems in the world, the Department must draw on commercial or dual-use technologies, products, and processes. When developing new systems, DoD prefers commercial options. The Department will develop military-unique capabilities or components only after it has determined that commercial technologies and products will not meet its requirements. Commercial markets are international by nature. Therefore, as the Department turns towards commercial industry, it will draw upon resources from international suppliers and will seek greater international cooperation with its allies.

Responding to the declining defense budget, defense firms reduced excess capacity, streamlined processes, and revamped supplier relationships. These actions have led to increased efficiencies, reduced defense product costs, and better value for taxpayers. However, these changes also could have important consequences for the Department's ability to meet its future mission requirements. The Department has therefore developed the policies and procedures necessary to make appropriate judgments about industrial issues and to integrate those judgments into its regular budget, acquisition, and logistics processes.

The Services and Defense Logistics Agency have issued guidance supplementing the DoD-wide guidance described in the succeeding sections of this chapter, for internal purposes.

2.2 Assessing Essential Capabilities

As a result of the reductions in procurement spending, DoD faces the risk that it could lose a particular supplier or particular capability. Companies may report that they are considering leaving a line of business, or may no longer provide a product or service to DoD. They may request that the DoD maintain a particular level of production or size of contract, regardless of DoD's present requirements. Since any of these actions involves use of limited resources, the Department must make considered, critical judgments before acting. DoD neither can, nor should, attempt to preserve all capabilities—only those both essential and genuinely at risk. Additionally, DoD's objective is to preserve essential capabilities, not any particular company.

On April 25, 1996, DoD published Directive 5000.60, "Defense Industrial Capabilities Assessments" and accompanying Handbook 5000.60-H, "Assessing Defense Industrial Capabilities." These documents establish the policies, procedures, and circumstances under which DoD will take special action to preserve an industrial capability.¹ They require DoD Components to validate that specific criteria are met before taking action or making an investment to preserve an industrial capability.

The problem warrants an industrial capability analysis; it is not a routine vendor management issue

These guidelines are not intended to replace normal vendor management procedures and authorities. There are many routine vendor problems that arise in program and item management: components become obsolete when manufacturers change models, companies stop making certain products, and other sources for the products must be qualified. Those problems currently handled through routine vendor management authorities are not candidates for an industrial capabilities analysis.

At least three scenarios call for an industrial capabilities analysis. The first is when DoD managers are faced with a problem in getting a needed product or service that they cannot resolve within their routine authorities and that may require special action or investment to resolve. (For example, the sole source manufacturer of a defense-unique product could advise that DoD's procurement requirements are too low and the manufacturer is going out of business.) The second scenario is when individual firms, industry associations, or other responsible sources warn DoD managers that an industrial capability is endangered. A third scenario is when product development or manufacturing is terminating either permanently or temporarily. DoD managers facing program termination should assess the potential loss of industrial capability if a future DoD need for the product or capability is identified.

¹ A copy of DoD Directive 5000.60 is included as Appendix A. Accompanying Handbook 5000.60-H is available on the World Wide Web (<http://www.acq.osd.mil/iai/ica.htm>).

There is a valid national security requirement for the product or service

The Department will only consider preserving a capability that is needed to support national security. Broadly speaking, defense requirements—current or future—fall into three categories. First, a product or service may be necessary to meet planned military missions. That is, it is needed to supply and equip the existing or planned force structure of the armed forces. (The planned force structure could be that required beyond the period of time encompassed by the Future Years' Defense Program.) The second category is a product or service needed to meet readiness or sustainment requirements. In such cases, the absence of a capability could affect the Department's ability to support defense systems, assemblies, or other components over the life cycle. (When defense products go out of manufacture, the Department requires post-production support for the useful life of the product. Readiness and sustainment requirements are determined based on product repair histories and planned overhaul schedules.) Third, a capability could be needed to support the design, development, or manufacture of next-generation defense equipment. Loss of such a capability could limit our ability to develop or field new systems, to modernize systems, or to make mission-driven upgrades.

The capability is truly unique

The DoD will only consider preserving specific industrial capabilities that are vital to providing the product or service in question, and are truly unique. DoD Components must verify that the capability exists in only one product or product line, and is so dissimilar from any other defense or commercial industrial capability that its loss would prohibit the Department from obtaining the defense product or service.

The unique capability is genuinely at risk

DoD relies on market forces to the maximum extent possible to guide the development and sustainment of industrial capabilities. Therefore, it will consider taking action only in those exceptional cases where an industrial capability, necessary to meeting defense requirements, is genuinely at risk of being lost. Generally, one of three conditions must be present for an industrial capability to be at risk of being lost. First, the only supplier is exiting because the product line is not sufficiently profitable. Second, the only supplier is exiting because the business unit is no longer financially viable. Third, the industrial capability is technically so complex and sensitive, such an intricate combination of science and art, that any interruption or reduction in the activity will cause the capability to be effectively lost. DoD Components must confirm the presence of at least one of these conditions by performing a financial analysis or technical analysis, as appropriate.

All feasible alternatives have been evaluated

DoD will take action to maintain an industrial capability only if the time or cost to regenerate that capability, once lost, would prohibit the Department from meeting its

mission needs. Therefore, the cost, risk, benefit, and legal authority of all feasible alternatives must be evaluated. Potential alternatives include, but are not limited to:

- Taking no action; that is literally choosing to take no action and make no investment to extend or preserve any part of the capability. (This alternative may be particularly appropriate in product areas for which the DoD near term requirement is terminating and future requirements are unclear, or would likely be met by a much-altered configuration.)
- Using an existing substitute product or capability, modifying an existing substitute product or capability, or modifying the DoD performance requirement so that a substitute product can be used.
- Making a buy-out to meet future DoD needs; that is buying a sufficient quantity to meet future needs and storing the product.
- Applying a new technology approach to replace either the product or the capability currently used to meet DoD needs.
- Investing in "smart shutdown" actions; that is, purposefully preserving certain elements (equipment, skills' inventories, data, etc.) essential to regenerating a product or service, while allowing the current development or production activities to cease.
- Using a reliable foreign source of supply.
- Investing in an acquisition action to preserve the capability by preserving development or manufacturing activity for the current product.
- Relieving or adding specific contract, policy, procurement, or export conditions that are hampering DoD access to a wider set of suppliers, or hampering endangered suppliers from potentially improved business opportunities.

The recommended action is the most cost- and mission-effective

The results of the analysis, including recommended actions and investment, must be summarized and presented to the designated decision authorities for approval. Decisions to take actions or make investments of less than \$10 million annually to preserve industrial capabilities may be made by the Component Acquisition Executive or Defense Acquisition Executive for Acquisition Category programs, or the Head of the Contracting Activity for all other programs. Only the Under Secretary of Defense for Acquisition and Technology may approve actions valued at \$10 million or more per year.

The funds and legal authority to make the investment have been identified

DoD components must define how and when the action would be incorporated into the budget and, if possible, identify budget offsets. Decisions to make investments to sustain industrial capabilities may be approved only by appropriate authorities:

- Only the Under Secretary of Defense for Acquisition and Technology may approve a proposed action or investment to preserve a capability with an anticipated cost of \$10 million or more annually.
- For Acquisition Category (ACAT), the Defense Acquisition Executive or the DoD Component Acquisition Executive, under the authority of the DoD Component head, may approve a proposed action or investment to preserve a capability with an anticipated cost of less than \$10 million annually.
- For non-ACAT programs, the Head of Contracting Activity, under the authority of the DoD Component Head to which the item or program is assigned, may approve a proposed action or investment to preserve a capability with an anticipated cost of less than \$10 million annually.

2.3 Planning Guidance

The Department periodically publishes internal planning guidance reflecting the highest priorities of the Secretary of Defense. This guidance provides a foundation of overarching objectives, and a starting point from which the Department balances requirements and resources as the program and budget are developed for each fiscal year. Most recently, the Secretary has directed that the Department rely on a defense industrial base sustained primarily by commercial demand. DoD intends to rely on market forces to guide the consolidation of the defense industrial base with government intervention only in exceptional instances. DoD's objectives are to:

- Promote a strong, technologically advanced industrial and technology base able to develop, produce, and support advanced military systems in a cost-effective manner, and
- Ensure that essential capabilities are available when needed.

The DoD plans to fight primarily using available materiel, including war reserve inventories and other existing resources. DoD Components develop industrial preparedness measures to permit accelerated production of munitions, critical troop support items, and spares *where this is a cost-effective alternative*. Given anticipated response times, requirements to "surge" production, and the need to maintain a "domestic mobilization base," are limited. DoD Components, however, do maintain the industrial capability needed to replace critical munitions, troop support items, and spares consumed during a conflict within a specified period of time after the conflict.

2.4 Armaments Cooperation and Foreign Vulnerability

During the Cold War, DoD Components restricted certain procurements to domestic sources to preserve a base for furnishing needed supplies or services in case of a national emergency or industrial mobilization. Today, instead of planning for an attack by the Soviet Union and its allies, DoD bases its wartime planning needs on a requirement to fight and win two nearly simultaneous major regional conflicts primarily while using existing resources, including stockpiled materiel.

With significant changes in military missions, sharp reductions in defense spending, and absent widespread mobilization requirements, DoD wants to take full advantage of the benefits offered by access to the best global suppliers. It also wants to promote consistency and fairness in dealing with its allies, while assuring that an adequate industrial base is maintained to support defense needs. For this purpose, DoD and many friendly governments have established reciprocal procurement agreements that waive their respective "buy national" laws and put each other's industries on par as potential suppliers. Consequently, DoD often relies upon foreign suppliers.

Although DoD is willing to use reliable foreign suppliers, it is not willing to accept foreign vulnerability, which poses risks to national security. Therefore, under specific circumstances, DoD can, and does, restrict specific procurements to domestic sources for mobilization base and other reasons.

On February 24, 1995, the Under Secretary of Defense for Acquisition and Technology issued policy guidance regarding the exclusion of foreign sources from a solicitation for mobilization base reasons. A decision to exclude foreign sources for a defense procurement on mobilization base considerations (that is, the authority under Federal Acquisition Regulation (FAR) 6.302-3(a)(2)(i) or FAR 6.202(a)(2)), may be approved only by the Under Secretary of Defense for Acquisition and Technology for procurements over \$50 million. For procurements up to \$50 million, the decision must be approved as prescribed by FAR 6.304 and Defense Federal Acquisition Regulation Supplement (DFARS) 206.304 or FAR 6.202(b) and DFARS 206.202(b).

The Department is taking steps to institutionalize this policy guidance within the DFARS.

DoD Handbook 5000.60-H, "Assessing Defense Industrial Capabilities" identifies other conditions in which reliance on foreign suppliers for specific products may constitute unacceptable foreign vulnerabilities.

- Foreign sources may pose an unacceptable risk when there is a high "market concentration" combined with political or geopolitical vulnerability. For example, a sole source foreign supplier existing only in one physical location and vulnerable to serious political instability may not be available when needed. (Market concentration alone is not sufficient reason to exclude foreign sources;

there also must be a credible threat of supply disruption due to political instability. Sheer physical distance from the U.S. is also not by itself a risk which merits foreign source exclusion.)

- Suppliers from politically unfriendly or anti-American foreign countries, as defined by statute or U.S. Government policy, are not used to meet U.S. defense needs.
- A U.S. source may be needed for technologies and products that are either classified, offer unique war fighting superiority, or could be used by foreign nations to develop countermeasures. However, the Department has agreements with many allied and friendly nations for safeguarding classified military information. Foreign sources cannot be automatically excluded on the basis of a need to protect classified or unique technologies or products; this must be determined by individual circumstance.
- Suppliers that cannot or will not provide products for military applications for political reasons are not feasible sources.

In such cases as these, the contracting officer, working in concert with the program manager, must obtain approval through the normal contract approval process to incorporate such exceptions into a procurement action.

2.5 Acquisition Regulations

For nearly 25 years, DoD Directive (DoDD) 5000.1 and Instruction 5000.2 have been centerpieces of defense acquisition policies and procedures. These documents describe a disciplined management approach for acquiring systems and materiel to satisfy valid military needs. On March 15, 1996, as part of its acquisition reform effort, DoD updated these documents to define an acquisition environment that makes DoD the smartest, most responsive buyer of the best goods and services, that meet warfighters' needs, at the best dollar value over the life of the product.

DoD 5000.2-R specifies that program industrial capability needs are to be met through reliance on a national technology and industrial base sustained primarily by commercial demand, with minimized need for new defense-unique industrial capabilities. Foreign sources and international cooperative developments are to be used where advantageous and within limitations of the law. The program acquisition strategy must analyze the industrial capability required to design, develop, produce, support, and if appropriate, restart the program. Prior to production termination, DoD Components must take actions to ensure there will be adequate industrial capabilities and capacities to meet post-production operational needs (for example, by addressing product technology obsolescence, replacement of life limited items, and regeneration options for unique manufacturing processes).

When there is an indication that industrial capabilities needed by DoD are in danger of being lost, DoD Components must perform an analysis to determine whether government action is required to preserve an industrial capability vital to national security.

2.6 Defense Capability Preservation Agreements

On May 13, 1996, the Department amended Part 231 of the Defense Federal Acquisition Supplement (DFARS), effective immediately, to implement Section 808 of the FY 1996 Defense Authorization Act (Public law 104-106). Section 808 permits the DoD to enter into a defense capability preservation agreement with a defense contractor where it would facilitate the achievement of the policy objectives relating to defense reinvestment, diversification, and conversion set forth in 10 U.S.C. 2501(b). Such an agreement would permit the contractor to claim certain indirect costs, attributable to its private sector work, on its defense contracts.

A contractor may submit a request for such an agreement, together with appropriate justification, through the Deputy Under Secretary of Defense for Industrial Affairs and Installations, to the Under Secretary of Defense for Acquisition and Technology, who has exclusive approval or disapproval authority.

3. DoD Assessments, Decisions, and Actions

3.1 Introduction

The Department periodically conducts assessments to identify and evaluate those industrial and technological capabilities needed to meet current and future defense requirements. It then uses the results of these assessments to make informed budget, acquisition, and logistics decisions. In some cases, the assessments address areas of interest which cut across Service boundaries. These assessments are performed in a cooperative manner with the appropriate DoD Components and civil agencies.

Industrial assessments are conducted to determine whether industrial or technological capabilities associated with an industrial sector, subsector, or commodity important to DoD could be lost. *Technology* assessments are conducted to evaluate the extent to which DoD has, or will have, assured and affordable access to selected leading edge technologies needed to meet military requirements. *Domestic source restriction* assessments are conducted to determine if those foreign product restrictions contained in the Defense Federal Acquisition Supplement that were imposed by a DoD policy decision, not by statute, still are required for national security reasons. Summaries of DoD assessments completed in 1995 and 1996 follow.

3.2 Industrial Assessments

Industrial Assessment for Space Launch Vehicles (January 1995)

DoD uses a wide variety of satellites to carry out its responsibilities. These range from weather and navigation to communications and surveillance. To place satellites into orbit, the Department relies upon a range of different expendable launch vehicles (ELVs), supplied by three prime contractors. The same type of ELVs, all initially based on DoD ballistic missile designs, are used for commercial, civil, military, and intelligence launches. This assessment focused on the major U.S. prime contractors which provided expendable vehicles for DoD launches. Launch systems and subcontractors were addressed to the extent necessary to understand the vehicles and the network of suppliers which build them. The assessment relied on many previous studies undertaken by DoD and others. The assessment concluded:

- The ability to place satellites in orbit is critical to the accomplishment of a range of national security missions.
- All three contractors supplying ELVs for DoD use are profitable.
- Reduced U.S. Government requirements for space launch and ballistic missiles and strong foreign competition have led to production overcapacity in the large and small vehicle segments of the U.S. launch industry.

- Substantial U.S. space launch industry consolidation is inevitable and necessary.
- Consolidation will ultimately result in reduced costs for ELV production and operations—and lower prices.
- Although the industry will consolidate, sufficient capable U.S. suppliers will remain. DoD has executed a bridge contract to maintain heavy-lifting capabilities during a period of low Titan IV demand. This contract stretches deliveries and sustains essential industrial and technological capabilities until a follow-on contract is executed.
- DoD also is taking action to improve launch vehicle capabilities and reduce the recurring cost of space launch. The Department is beginning a program to develop a single evolved expendable launch vehicle (EELV) family capable of handling medium and heavy payloads. A family of vehicles with common subsystems and components will increase production efficiency and reduce production and operations costs.
- These actions will have additional benefits. They will (1) sustain essential capabilities during industry consolidation, and (2) improve the international competitiveness of U.S. space launch providers by developing more cost-effective vehicles.
- For the foreseeable future, DoD expects space launch industrial capabilities will be adequate to meet its needs. Projected production requirements, coupled with ongoing and planned actions (the Titan IV bridge contract and the EELV program) are sufficient to sustain required production and design capabilities. No instances of vulnerability due to foreign suppliers were identified.

Industrial Assessment for Helicopters (July 1995)

DoD uses helicopters to meet a variety of military missions. The unique demands of these missions—primarily engaging an enemy—require military helicopters to have capabilities that non-military “civil” helicopters do not need. Although many civil helicopters are spin-offs of military models, civil helicopters generally lack the specialized navigation and electronic equipment, weapon systems, and related systems that provide military capabilities. This assessment focused on the four domestic prime contractors which provide for the majority of DoD’s helicopter needs. The assessment also included key helicopter subsystem and component suppliers. The assessment concluded:

- Military helicopters are versatile, flexible, and are used to meet a variety of DoD missions.

- Civil and military helicopters have significantly different missions. As a result of these differences, DoD helicopters are generally more powerful, complex, and expensive than civil helicopters.
- DoD helicopter requirements have declined. Within two years there will be one new production program (the V-22 Osprey) and one research and development program (the RAH-66 Comanche).
- Worldwide helicopter demand is stable, and demand for larger, multi-engine turbine civil helicopters and military helicopters with modern electronics systems is growing.
- All four major prime contractors supplying helicopters for DoD use are profitable.
- Reduced DoD requirements for helicopters, and strong foreign competition, have led to significant U.S. prime and subsystem contractor production overcapacity.
- Many industry observers believe that U.S. helicopter industry consolidation is likely. DoD intends to allow the natural forces of the market to determine the make-up of the helicopter industry. Subsystem/component manufacturer consolidation already has begun.
- Consolidation will ultimately result in reduced costs for helicopter development, production, and support—and lower prices.
- Although the industry will consolidate, the Department expects that helicopter industrial capabilities will be retained after consolidation, and will be ample to meet DoD requirements.
 - ◊ The four major prime contractors all possess adequate systems engineering and integration capabilities.
 - ◊ There are several capable suppliers for required subsystems and components.
 - ◊ DoD will continue to fund helicopter programs (V-22, Comanche, and various upgrades), even as the industry consolidates.
 - ◊ Domestic civil sales, foreign sales, and DoD overhaul and maintenance demands will contribute to needed revenues.
 - ◊ No instances of vulnerability due to foreign suppliers were identified.

Industrial Assessment for Torpedoes (August 1995)

DoD uses acoustic homing torpedoes to locate, pursue, and destroy surface ships and submarines. Heavyweight torpedoes are used solely by submarines and are employed against both surface and submarine targets. Lightweight torpedoes are used by fixed wing aircraft, helicopters, and surface ships for anti-submarine operations. Torpedo design requirements have resulted in the establishment of a "defense-unique" industrial sector with specialized skills and facilities for torpedo development, production, and support. Some torpedo components are similar to commercial and other defense products. This assessment focused on the three U.S. prime contractors and various Navy facilities which produce, upgrade, and support U.S. Navy torpedoes. The assessment concluded:

- The three prime contractors currently are profitable.
- As a result of the end of the Cold War and diminished threat levels, DoD's current inventory of torpedoes exceeds its requirements.
- The DoD will not require "all-up round" torpedo production after the final MK-50 and MK-48 ADCAP torpedoes are delivered in 1996, until replacements are needed in approximately 25 years.
- Reduced DoD torpedo requirements, and strong foreign competition, have led to significant U.S. prime and subsystem contractor production overcapacity.
- Many vendors have completed deliveries and are exiting the torpedo business. Vendors supplying consumable and expendable items will be relatively unaffected by the end of torpedo production. Torpedo component vendors supplying replenishment spares will be affected to a greater degree, but supplies will continue to be available. No instances of vulnerability due to foreign suppliers were identified.
- Although not required to meet the Department's production needs, some production capabilities will be sustained by exports.
- DoD does have requirements to advance torpedo technologies, upgrade the current inventory, and support torpedo operations. Planned torpedo development, modification, and maintenance programs will sustain required industrial capabilities.
 - ◊ Technology development programs will sustain torpedo design and engineering knowledge and development facilities. These capabilities will assist the reestablishment of torpedo production when needed.
 - ◊ Adequate capabilities exist to support the Navy's planned upgrade programs.

- ◊ Planned operations and maintenance programs will sustain the skills and facilities needed for torpedo support.
- Based on a net present value analysis, the lead time and recapitalization costs associated with the reestablishment of a full production capability are preferable to the more expensive option of preserving production capabilities for increasingly obsolete designs.

The DoD will reestablish "all-up round" torpedo production capabilities, when necessary, in approximately 25 years.

Industrial Assessment for Tracked Combat Vehicles (October 1995)

The Army and Marines use tracked combat vehicles (TCVs) as ground combat systems—for close combat, fire support, combat support, and amphibious assault. All are designed to win on the battlefield as quickly as possible. TCVs fall into two weight classes—heavy and medium/light. Heavy TCVs weigh over 40 tons and normally are fabricated from steel. Medium/light TCVs weigh less than 40 tons and normally are fabricated from aluminum. This assessment focused on the two domestic prime contractors and key subsystem and component suppliers which provide for the majority of the Department's TCV needs. The assessment concluded:

- TCVs must meet stringent and highly specialized military operational requirements. TCV design, integration, and most manufacturing capabilities are not available from commercial, or other defense, industries.
- U.S. TCV producers depend heavily on DoD business.
- DoD TCV procurement requirements have declined significantly from the peak production years of the mid-1980s. For example, the U.S. Army does not plan to acquire any new tanks in the next ten years. However, DoD funding is expected to remain relatively stable for the foreseeable future. Funding stability can be as critical as absolute funding dollars.
- The Department plans to develop a TCV modernization plan. The plan will address the aging TCV fleet, requirements for new and follow-on vehicles, and technology needs. This plan may lead to changes in projected Department requirements, particularly in technology areas.
- The world export market for heavy TCVs is limited. Prospects for foreign sales of U.S. heavy TCVs therefore also are limited. The export market for medium/light TCVs is good. Therefore, there are better prospects for U.S. foreign sales of medium/light TCVs.

- As DoD requirements have declined, the domestic TCV industry has consolidated from three prime contractors to two—General Dynamics Land Systems and United Defense, Limited Partnership. Both are profitable.
- Both prime contractors are taking steps to reduce costs and improve their competitive position by (1) consolidating operations and reducing their supplier base and (2) developing the ability to design, integrate, and fabricate both heavy and medium/light TCVs.
- The existence of two prime contractors encourages competition and innovation.
- As procurements have declined, some TCV suppliers have exited the business. This is a normal business response to reduced demand.
- Despite a difficult transition period, ongoing and planned DoD new vehicle, derivative, and upgrade/modification programs, coupled with prospective foreign sales of medium/light vehicles, generally will be sufficient to sustain needed prime contractor and supplier industrial capabilities.
- Planned advanced technology demonstrators and funded research and development will sustain a level of TCV engineering capabilities that will be just adequate to support TCV system technology needs.
- In a few cases, DoD has taken action to ensure it has continued access to the components it needs to meet requirements. Examples of such action to sustain supplier capabilities include the Abrams X1100 transmission - Allison Transmission; the AGT 1500 engine - Allied Signal; the V903 engine - Cummins Engine; and the track rubberizing process - Goodyear. The Department will continue to identify and address supplier concerns as they arise. No instances of vulnerability due to foreign suppliers were identified.
- Retaining sustaining engineering expertise appears to be a significant sustainment problem. The Army is developing alternatives to provide adequate TCV sustaining engineering capabilities to support fielded systems, despite declining procurement.

Industrial Assessment for the Meal, Ready-to-Eat (December 1995)

The Meal, Ready-to-Eat (MRE) is the DoD's "go to war" ration, designed to provide individual meals to troops in austere environments. The actual MRE has virtually no commercial counterpart, since commercial products do not meet the stringent military nutrient, shelf life, and packing requirements. About half of the components in an MRE, however, do consist of commercially-developed food components. This assessment focused on the four types of primary MRE suppliers—retorters, bakers support component suppliers, and assemblers. The assessment concluded:

- DoD uses the MRE to provide troops a nutritionally complete, individual meal in austere environments when no supporting cooks or group rations can be provided.
- DoD is employing innovative acquisition strategies and business practices to help lower the cost of MREs. These practices will increase contractor efficiencies and economies of scale, maintain effective competition, encourage MRE supplier diversification into commercial markets, and fund new technologies to improve production efficiency and response time.
- Between 1981 and 1995, the price for an MRE decreased 22 percent in real terms—despite improvements in acceptability, nutrition, and durability.
- In peacetime, MREs feed military combat personnel during training and limited military operations, and serve as pre-positioned war reserve stocks.
- During the first 60 days of mobilization, war reserve stocks are used almost exclusively until the MRE industry can surge production to meet significantly greater mobilization requirements.
- DoD purchases account for the majority of MRE retort, baker, and assembly firms' business. DoD therefore must ensure the industry retains sufficient industrial capability to meet its wartime (mobilization) requirements.
- DoD MRE procurement requirements are projected to remain relatively stable, at about 2.1 million cases annually. MRE suppliers also produce related individual rations to support humanitarian relief missions.
- Ongoing and planned DoD operational ration technology programs are necessary to meet evolving battlefield and doctrine requirements. They also will sustain a scientific and engineering capability sufficient to meet the Department's MRE requirements for the foreseeable future.
- Production capabilities are, and are expected to remain, sufficient to meet both peacetime and mobilization requirements.
 - ◊ No instances of vulnerability due to foreign suppliers were identified. (Section 9005 of Public Law 102-396, As Amended [10 U.S.C. 2241 Note] requires DoD to purchase food grown or produced within the U.S.)
 - ◊ Retort and assembly supplier profitability levels continue to be comparable to those of their commercial counterparts.

- ◇ To ensure required production capabilities remain available, DoD is monitoring those bakery suppliers that are less profitable than their commercial counterparts.
- ◇ To ensure, MRE suppliers have sufficient capacity to meet both peacetime and mobilization requirements, DoD has developed acquisition strategies that consider required mobilization capacity, economic sustainment of the industry, and the need to maintain continuing production to provide a foundation from which to surge.
- ◇ DoD has entered into planned producer commitments for retorted items and assembly with those firms needed to meet mobilization requirements, and has laid away specialized equipment to ensure sufficient increased production capacity is available.

Heavy Bomber Industrial Capabilities Study (December 1995)

This assessment was prepared in response to a specific requirement of the Fiscal Year 1995 Defense Authorization Act—to determine if the coming end of B-2 bomber production could affect the nation's ability to produce bombers in the future. TASC, Inc., under a contract with the Office of the Secretary of Defense, prepared the assessment. The assessment addressed the core capabilities associated with the B-2. It considered if those capabilities were dependent on continued B-2 production or if essential capabilities to restart the B-2 or produce the next generation heavy bomber would be retained through other military and commercial aircraft programs. The assessment concluded:

- Industrial capabilities for bombers are not unique. They are drawn from the broad aircraft industrial base and there is extensive overlap with other military and commercial aircraft.
- B-2 technology, design, and production requirements are no longer unique. Over the last decade, the most innovative technologies applied to the B-2 have matured and been applied to other aircraft.
- Aircraft prime contractors and suppliers have shown great flexibility in undertaking new bomber programs in the past, and are likely to continue this business posture into the future.
- Aircraft industry economic projections indicate that the downward sales trend of the last ten years is reversing—sales are expected to grow.
- Cessation of B-2 production will not prevent the nation's aircraft industry from building bombers in the future. Restart difficulty, time, and cost are affected by decisions to “shut down” smoothly and make targeted investments to “lay away”

tooling and other items. If required, B-2 production can be restarted during the next decade without inordinate difficulty.

- For the next generation bomber, it is important to pursue affordability goals in conjunction with technology development, and to transition these efforts into the design and development phase of the new program.

Joint Service Industrial Assessment for the Nuclear, Biological and Chemical (NBC) Defense Sector (August 1996)

This assessment was prepared to screen the NBC defense sector to identify industrial capabilities concerns requiring further analysis. It evaluated current and projected Service NBC stockpiles; research, development, and acquisition programs; and related technologies. The assessment drew on several previous studies, including DoD Component assessments conducted for specific NBC products. The NBC defense sector consists mainly of small businesses. Peacetime military and commercial sales are negligible. Emergency surge and replenishment requirements are substantial. The assessment concluded:

- With respect to *contamination avoidance* capabilities, a limited number of firms provide chemical point detection products. The industry is growing and should support development and fielding of more sophisticated point detectors after FY 03. No firm yet has demonstrated a capability to produce military-hardened active agent detectors.
- With respect to *individual protection* capabilities (1) future protective mask peacetime and surge production requirements are sufficient to support only one contractor, (2) due to funding priority decisions, battlefield protective suits are not being produced, despite inventory shortfalls, (3) planned funding is inadequate to replenish "limited shelf-life stocks" to meet requirements for a second MRC, beginning in FY 05, and (4) stockpiles of protective gloves and boots do not meet inventory objectives. Funding for improved protective gloves and protective overboots is programmed to replace older items in the stockpile.
- Because of the dual-use nature of *decontamination* capabilities, there are no industrial issues within that subsector. However, the decontaminant (DS-2) in many decontamination systems is both corrosive and carcinogenic. DoD will evaluate the current DS-2 stockpile to determine if it should be abandoned and alternative decontaminants developed.
- Because of the dual-use nature of *radiacs* (radiation detectors), there are no industrial capability issues. The Services are modernizing outdated, inadequate fielded radiacs.

- The *medical NBC* program is composed of the nuclear medical defense program (post-attack treatments focusing on medicines commonly used to treat burn and radiation poisoning victims) and the biological defense program (focusing on vaccines and antidotes to address the threat of the use of biological warfare agents). Liability insurance, Food and Drug Administration regulations, low peacetime military and commercial demand, and difficult technical requirements combine to limit industry interest. Maintaining domestic sources for mobilization purposes continues to be difficult.

The Joint Service Materiel Group is identifying and evaluating alternatives to address stockpile shortages, to increase industry interest in providing NBC products and services, and to clarify future Department NBC development and acquisition requirements.

Industrial Assessment for Radiation Hardened Microelectronics (December 1996)

The Department uses radiation hardened (Rad Hard) microelectronics to ensure that key military systems will perform in the combined nuclear and natural radiation environments. This assessment was designed to determine if there are and will be sufficient industrial capabilities—technology, engineering, manufacturing, and test—to meet DoD needs for Rad Hard integrated circuit (IC) production and new product advances. The assessment concluded:

- Defense systems are required to operate in more severe radiation environments than commercial satellites.
- Rad Hard ICs provide long term survivability and nuclear survivability not available in commercial electronics.
- Rad Hard IC manufacturing requires variations of commercial manufacturing design, process, and device layout.
- A significant knowledge skill base is needed to meet DoD's upper Rad Hard (URH) IC needs.
- The 1996 Rad Hard IC market is approximately 0.1 percent of the \$140 billion worldwide semiconductor market.
 - ◊ Commercial space users do not need URH ICs, but will buy them, if available, to mitigate risk through increased performance margin.
 - ◊ Commercial non-Rad Hard parts cannot be upgraded to meet URH needs.

- ◊ Foreign supplier URH IC capabilities are diminishing. They generally provide products 1 - 2 generations behind those of domestic suppliers. DoD will continue to rely primarily on domestic URH IC suppliers.
- The demand for URH ICs is projected to increase, but is sensitive to individual program decisions.
- Rad Hard IC product development requires roughly equal amounts of enabling technology development and system program office specific product development funding.
- In the near term, the industrial capabilities required to meet DoD's URH IC needs are not endangered.
- The long term availability of Rad Hard ICs is inextricably tied to (1) reorienting investment objectives for DoD Rad Hard IC technology programs to better leverage commercial IC investments, (2) expanding new product development by DoD system program offices to close the gap between technology development and product availability to meet program needs, (3) coordinating acquisition strategies, and (4) focusing management and oversight.

To better meet its continuing requirements for Rad Hard ICs, the Department will: (1) develop an integrated investment strategy to focus required technology and new product development activities, (2) establish a process to improve Rad Hard IC coordination and cooperation both within the Department and with other U.S. Government Agencies, and (3) establish a graduate initiative to assist in maintaining core Rad Hard IC competencies within government and the industry.

3.3 Technology Assessments

Technology Assessment of Advanced Materials (January 1996)

This assessment examined the extent to which the commercial capabilities of the technology and industrial base for advanced materials can provide assured access to the leading edge technology products necessary to meet military requirements. When access is assured, the study also examined whether commercial capabilities will be sufficient by themselves or if there are issues concerning affordability or the availability of the high end technology which DoD should address. The assessment divided advanced materials into specialty metals (superalloys, titanium, and beryllium) and advanced composites (polymer matrix composites or PMCs), ceramic matrix composites (CMCs), metal matrix composites (MMCs), and high thermal conductivity composites). The assessment concluded:

- The industrial bases for *specialty metals* will downsize to reduce overcapacity in response to normal competitive market forces. This downsizing will not be inconsistent with future defense requirements. Issues of assured or affordable access do not appear significant.
 - ◊ In the case of titanium, the study also found that new military demand could emerge if prices were reduced by 40 percent or more. However, it is the responsibility of industry to address these cost reduction issues unless a specific cost benefit analysis shows that it is in the best interest of DoD to take action.
- The *PMC* industrial base will be able to satisfy military needs in the future.
 - ◊ There are certain areas (pitch-based carbon fibers, PMC fabrication) where the costs to DoD could be reduced. Projects are underway to achieve such cost reductions.
 - ◊ If potential insertion opportunities arise, they may improve DoD's access to PMCs. However DoD funding for any such project must be contingent on that project passing a cost-benefit test on its own merits.
- The *CMC* industrial base will be able to satisfy military needs in the future. Department of Energy investments in CMCs will serve DoD needs in that those capabilities being developed also will satisfy military requirements. It is not necessary for DoD to take the lead in technology development.
 - ◊ As was the case with PMCs, if potential CMC insertion opportunities arise, DoD funding support should be contingent on a demonstration that the expected life cycle costs to DoD are reduced as a result of the project and that the inserted product performs at least as well as the item replaced.
- There are potential issues of assured, affordable access for *continuous MMCs* (cMMCs). Industry is not capable of satisfying a high volume DoD demand for this material.
 - ◊ Low volume production costs are high.
 - ◊ While the use of cMMCs provides several near term opportunities to reduce total DoD life cycle costs and to improve the military capability of gas turbine engines, the current "precompetitive" industrial base cannot produce the cMMCs in sufficient volume.

- ◇ The numerous technical and economic barriers to widespread use identified in this assessment cannot be overcome by industry alone. There has been little application-specific investment to ensure an item can be produced.
 - ◇ The identified technical and economic problems are not insurmountable. A project was identified to establish long term, viable cMMC producers capable of meeting potential DoD quantity demands by transitioning manufacturing technology developed by industry from pilot scale to full scale production.
 - ◇ DoD has not quantified high volume requirements for discontinuous MMCs (dMMCs). While access seems assured, the issue of affordability cannot be addressed until the demand is well established.
- There are no issues of assured access for high thermal conductivity composites. DoD is funding its unique requirements.
 - ◇ Because of low volume production, DoD costs will probably not decline substantially.
 - ◇ Lower DoD costs and increased DoD usage will occur only when volume commercial production applications materialize. Based on current needs and costs, it would be incumbent on industry, not DoD, to develop such commercial applications and markets.
 - ◇ Should an insertion project materialize, funding support must be justified by a cost-benefit analysis.

The Department is using the authorities of Title III of the Defense Production Act to transition titanium metal matrix composite (a cMMC) manufacturing technology developed by industry from pilot production to full scale production.

Technology Assessment of Semiconductor Packaging (April 1996)

This assessment addressed military semiconductor packaging requirements, and summarized the status of the packaging industry, including issues related to meeting national security needs. The assessment focused on the enclosures protecting the individual integrated circuit chips. The assessment concluded:

- Commercial capabilities for single-chip semiconductor packaging are sufficient to meet military needs.
- The Department of Defense currently lacks the early, assured, and affordable access needed to meet its requirements for high performance multi-chip modules (MCMs) and other leading-edge semiconductor packaging.

- Several actions should be taken to ensure that military requirements for cost and performance are met:
 - ◊ Continue R&D investment and joint industry/DoD development of new manufacturing technologies.
 - ◊ Increase development of new materials and computer aided design tools.
 - ◊ Continue efforts to accelerate the use of commercial integrated circuits in military systems.

The Department is funding R&D for MCM packaging. It is continuing to evaluate the other recommendations.

Overcoming Barriers to the Use of Commercial Integrated Circuit Technology in Defense Systems (October 1996)

DoD needs a long-term strategy for effectively dealing with commercial integrated circuit (IC) suppliers. Taking best advantage of commercial IC technology in defense systems will depend on complementary changes in DoD electronics development and acquisition practices. Defense systems design, procurement, production, maintenance, upgrade, and support practices must be compatible with best commercial practices, and with each other. Use of best commercial development practices, in combination with new contracting arrangements, can encourage competition throughout a system's life cycle. In the near-term, DoD can take actions that move it toward new system development and acquisition practices. This assessment identified barriers to effectively using commercial ICs, and made recommendations to overcome those barriers. The report focused on design practices, requirements definition practices, and contracting practices. The assessment concluded:

- The need to employ commercial ICs does not diminish the importance of developing and inserting advanced, defense-unique IC technology.
- DoD still will benefit from using defense-unique technologies in areas where a significant technical advantage can be achieved affordably or where a distinct defense need cannot be met by adapting a commercial process or design.
- For most of its IC needs, however, DoD must rely on commercial industry.
- Barriers to broader use of commercial IC technology can be overcome.

| <i>Barrier</i> | <i>Effect of Barrier</i> | <i>Recommendations</i> |
|--|--|--|
| Design Practices Information about defense applications and commercial performance is often insufficient to employ commercial ICs with confidence. | Overly conservative system designs Uncertainty regarding new commercial technologies true performance and reliability can inhibit their use. | <ul style="list-style-type: none"> ◇ Define new DoD IC operating environments to include existing commercial standards. ◇ Characterize commercial product performance in terms of the new operating environments. ◇ Coordinate IC characterization projects and dissemination of results. ◇ Implement Mil-Spec reform carefully. |
| Requirements Definition Practices: Packaging Distinct defense requirements for IC packaging. | Unnecessary or outdated packaging requirements can inhibit use of commercial ICs in defense systems and limit the availability of ICs that meet defense needs. | <ul style="list-style-type: none"> ◇ Establish the capabilities and limitations of commercial packaging technologies. ◇ Leverage commercial advances in packaging, especially in areas such as multi-chip modules. ◇ Continue R&D investments in advanced packaging materials & computer design tools. |
| Requirements Definition Practices: Quality Assurance Distinct defense practices for IC quality assurance. | Unnecessary or outdated quality assurance practices can inhibit use of commercial ICs in defense systems and limit the availability of ICs that meet defense needs. | <ul style="list-style-type: none"> ◇ Create commercial interest in the Qualified Manufacturers List (QML) program by providing technology transfer in related areas of DoD expertise. ◇ Enhance Standard Microcircuit Drawings (SMDs) to capture IC specifications in a form compatible with commercial standards. |
| Contracting Practices Historical defense acquisition practices and reforms that have yet to be implemented | Old government contracting practices discourage commercial companies from doing business with DoD | <ul style="list-style-type: none"> ◇ Clarify government auditing rights in acquisition of commercial items. ◇ Clarify government policy on intellectual property ownership in the acquisition of commercial items and for government-funded work. |

To meet on-going requirements, the Department has begun to (1) define new DoD IC operating environments consistent with commercial standards, (2) carefully implement Mil-Spec reform, (3) establish the capabilities and limitations of commercial packaging technologies of importance to DoD, and (4) leverage commercial advances in packaging.

The Department is continuing to evaluate the other recommendations to determine how best to incorporate them into its design, requirements definition, and contracting practices.

3.4 Domestic Source Restriction Assessments

Both the Congress and the Department have established restrictions on the use of foreign products in defense systems. (DoD's foreign product restrictions were imposed by administrative action, not by statute.) The restrictions were designed to preserve a domestic mobilization base—to maintain the industrial capability required to rapidly produce the defense materiel needed to respond to an attack by the Soviet Union. For the foreseeable future, this threat is gone. Today, DoD bases its wartime planning needs on a requirement to fight and win (primarily from existing resources, including already stockpiled materiel) two nearly simultaneous major regional conflicts. In 1996, the Department examined all foreign product restrictions contained in the Defense Federal Acquisition Regulation Supplement (DFARS) that were imposed as a result of a DoD policy decision. (The Department did not formally evaluate all foreign product restrictions imposed by statute.) For each restriction, the Department carefully determined if there were national security reasons or supplier reliability, cost, and quality reasons for retaining the restriction. The assessment concluded:

- The Department will retain DFARS subpart 225.7013 (requires that all new major defense systems use domestic sources for Polyacrylonitrile (PAN) carbon fiber requirements).
 - ◊ Aerospace-quality PAN-based carbon fibers increasingly are important to achieving performance advantages necessary for military superiority, and are used in numerous DoD weapons systems.
 - ◊ There is little advantage to rescinding the DFARS restriction. DoD appears to pay little or no performance, cost, or schedule penalty for acquiring PAN-based carbon fiber exclusively from domestic sources.
 - ◊ Retaining the DFARS restriction will sustain domestic suppliers and ensure DoD will have continued access to the industrial and technological capabilities needed to meet its PAN-based carbon fiber requirements.
- The Department will rescind DFARS subpart 225.7020 (requires that all new major defense systems use domestic sources for coal and petroleum pitch carbon fibers).
 - ◊ Pitch-based carbon fibers, first developed in the 1970s, are used in “carbon carbon” brakes for military and commercial aircraft.

- ◇ Later generation pitch-based carbon fibers are used in military and commercial satellites and the Boeing 777 engine cowling.
- ◇ The newest pitch-based fibers have significant potential. These fibers have exhibited extremely high thermal conductivity in the fiber direction and a negative coefficient of thermal expansion, permitting precise tailoring of thermal expansion in the finished material. Precise thermal expansion can be vital to reducing thermal strain and distortion, thereby significantly increasing the reliability of sensitive electronic and spacecraft systems.
- ◇ Demand for these ultra-high modulus and high or ultra-high thermal conductivity pitch-based carbon fibers generally is limited to prototypes. High cost appears to be inhibiting increased demand. Current world-wide demand is considerably less than available capacity.
- ◇ The DFARS restriction may be preventing DoD from taking advantage of superior foreign products. Ultra-high modulus and high or ultra-high thermal conductivity pitch-based carbon fibers supplied by U.S. sources appear to be more expensive and of less strength than those of foreign suppliers.
- ◇ There is no national security reason to preclude using foreign suppliers.
- The Department will rescind those provisions of DFARS subpart 225.71 which impose restrictions for various ferrous forgings, precision components for mechanical time devices, high purity silicon, and high carbon ferrochrome. (This decision does not include those ferrous forgings used by the Navy, addressed below.)
 - ◇ A domestic mobilization base is not required for the classes of ferrous forgings in question.
 - ◇ If an occasion arises where specific restrictions are warranted, DoD can use other authorities, such as the Justification and Approval process, to restrict a procurement to domestic sources.
 - ◇ The Department of Commerce has reported that the domestic forging industry is healthier and more efficient than it was when the restrictions were first imposed. Both productivity and exports have increased.
- The Department will not rescind those provisions of DFARS subpart 225.71 which address periscope tube forgings, ring forgings for bull gears, and ship propulsion shaft forgings. The Department plans to indefinitely retain the restrictions for periscope tube forgings and ring forgings for bull gears, and defer for one year final consideration of similar restrictions for ship propulsion shaft forgings.

- ◇ Access to the detailed specification and manufacturing process information for periscope tube forgings and ring forgings for bull gears could provide insights into submarine optical and propulsion system performance limitations, thereby compromising the effectiveness of U.S. submarines.
- ◇ Unsettled conditions among the domestic suppliers of Navy propulsion shaft forgings make projections uncertain.

4. DoD Component Analyses, Decisions, and Actions

4.1 Introduction

DoD assessments are not required when addressing areas of interest which do not cross DoD Component boundaries. DoD Components frequently conduct their own analyses when (1) there is an indication that industrial or technological capabilities associated with an industrial sector, subsector, or commodity important to a single DoD Component could be lost; or (2) it is necessary to provide industrial capabilities information to help make specific programmatic decisions. Summaries of such DoD Component analyses completed in 1995 and 1996 follow.

4.2 Army

Operation and Maintenance of Thirteen Government-Owned, Contractor-Operated Active Army Ammunition Plants (August 1995)

The Army operates and maintains 13 Government-Owned, Contractor-Operated (GOCO) Army Ammunition Plants. Six of the plants actually are producing ammunition. The rest are in a "laidaway" status to meet future mobilization/replenishment requirements. The 6 active GOCOs are used for hazardous operations manufacturing explosives, loading explosives into projectiles, assembling explosive-filled projectiles into cartridge cases, and packaging complete items for shipment and storage. This assessment was designed to determine if plant operation and maintenance contracts should be competed, or awarded to existing plant contractor operators on a non-competitive basis. The assessment concluded:

- The Army does not routinely compete GOCO plant operation and maintenance contracts. Disruption of a plant's operation during a yearly competition could negatively impact on-going ammunition production, as well as mobilization (replenishment) readiness.
- The Army competes GOCO operation and maintenance contracts only under exceptional circumstances—for cause (in effect, for poor performance), if a contractor wants to terminate the agreement, or for new plants. The Army is considering competing one plant, for cause, in FY 97.
- GOCO plant operations are not viable candidates for full and open competition.

The Army decided to restrict plant operation and maintenance contracts to the current operating contractors for mobilization base reasons, as permitted in FAR 6.302-3.

Non-Rechargeable High Performance Batteries (December 1995)

Certain high performance non-rechargeable batteries are the primary power source for the majority of the U.S. Army's "manportable" communications-electronics equipment into the next century. This assessment was designed to determine if contracts for these batteries should be

competed fully or restricted to "domestic" suppliers (that is, suppliers located in the U.S. and Canada). The assessment concluded:

- The batteries are subject to production surge requirements which can exceed twenty times the peacetime levels. Potential suppliers predominantly serve military customers. These batteries are not purchased by commercial customers.
- The U.S. and Canada have entered into an Executive Agreement under which Canadian firms producing materiel for the U.S. military are bound by the provisions of the Defense Priorities and Allocations System (DPAS).
- Under DPAS, firms can be compelled to meet military requirements by (1) performing specific defense contracts on a priority basis over other defense or non-defense contracts, and (2) rapidly increasing production to maximum capacity. Firms located in other nations cannot be so compelled.

The Army decided to restrict these contracts for high power non-rechargeable batteries to U.S. and Canadian contractors for mobilization base reasons, as permitted in FAR 6.302-3.

Crusader Industrial Base Assessment (December 1995)

The Crusader is the Army's next generation 155mm self-propelled howitzer. It will provide a significant increase in artillery survivability, lethality, mobility, and operational capability and effectiveness by integrating advanced technology subsystems and combat components. The Crusader will deliver unprecedented firepower capabilities at extended ranges. The assessment was designed to evaluate the availability of the resources required to develop, produce, maintain, and support critical components of the Crusader system. Information for the assessment came from three sources: the dedicated Crusader Transition to Production Team, site visits, and the October 1995 Industrial Assessment for Tracked Combat Vehicles. The assessment concluded:

- Existing Government and industry industrial capabilities are sufficient to develop, produce, maintain, and support the Crusader given implementation of planned strategies and programs.
- Planned strategies and programs include a Crusader Production Readiness Strategy, continued monitoring of the base's current and projected workload and financial viability, and various industrial projects necessary to meet program requirements (Manufacturing Science and Technology and provisioning of industrial facilities).

M40/42 Protective Mask Industrial Assessment (April 1996)

The Army historically has split procurement of the M40/42 chemical protective masks between two contractors to ensure there was sufficient production capacity to meet surge and

mobilization production requirements. The Defense Planning Guidance has been modified to reflect current threats, the Army force structure has declined, and surge and mobilization requirements for these masks have been replaced with replenishment requirements. The combined capacities of the two contractors are greater than the anticipated replenishment requirements. This assessment was designed to determine if the current individual contractors had sufficient industrial capabilities to preclude the need to continue to split procurements. The assessment concluded:

- The masks are "critical items." They must be available when a conflict begins, and must be replenished rapidly after a conflict. Under today's operational scenarios, each contractor has sufficient industrial capabilities to meet the Department's peacetime and replenishment requirements.
- The two contractors have been involved in engineering improvements to the mask. The engineering experience at the two companies has been valuable to the Department and could be valuable on the next generation protective mask.
- The Army previously has entered into a "Restricted Specified Base No Cost Production Planning Schedule Contract" with each supplier for the masks in question. The firms agreed to provide production planning information to support accelerated production; and to maintain specified crisis/emergency production capacity during active production of the masks and for a period of three years after production completion. In return, the Army has agreed to solicit only members of the Restricted Specified Base when procuring the masks.
- Peacetime and replenishment requirements are such that a split award of the M40/42 mask can no longer be justified.
- Based on the criteria in DOD Handbook 5000-60-H, the Department does not need to take any action to retain the industrial capability required for the M40/42 mask.

The Army will periodically review readiness and replenishment requirements for the M40/42 mask to determine if: (1) production requirements increase beyond the capability of one producer, and (2) if actions need to be taken. Additionally, the Army will continue to keep abreast of ongoing acquisition streamlining efforts within DoD and assure the M40/42 mask is procured from reliable sources making a quality product.

Since either contractor had sufficient industrial capabilities to meet all Department requirements, the Army will award a "winner take all" competitive contract for all projected DoD M40/42 protective mask requirements. The Army will restrict competition to the two contractors, for mobilization base reasons, as permitted in FAR 6.302-3.

Munitions FY 96 Functional Area Assessment (April 1996)

The FY 96 Munitions Functional Area Assessment (FAA) evaluated all aspects of the management of ammunition and missiles, including stockpile status, storage, and industrial capabilities. The assessment concluded:

- Additional FY 97 funding (via internal realignment) for Ammunition Production Base Support (PBS), the Armament Retooling and Manufacturing Support (ARMS) Program, flexible manufacturing lines within the Government-owned base, operations and maintenance, and demilitarization is necessary to meet the Army's stated objectives.
- Planned missile procurements partially maintain limited missile replenishment capacity.
- The FY 97 FAA will be expanded to include research and development activities.

The FY 96 FAA was briefed to Army, other Service, OSD, and Congressional staff representatives. Due to higher priority funding needs, the Army did not program additional funding as recommended in the assessment. However, the Congress authorized and appropriated additional FY 97 munitions funding totaling \$273 million for war reserve inventories (\$208 million), training (\$11 million), PBS and ARMS (\$47 million), and ammunition demilitarization (\$7 million).

Acquisition of 120mm Battalion Mortar Cartridge Bodies (August 1996)

This assessment was designed to determine if a sole source, non-competitive contract for 120mm battalion mortar cartridge bodies should be awarded, for mobilization base reasons, to the operator of the inactive Scranton Army Ammunition Plant. The operator of the inactive Scranton Army Ammunition Plant (AAP) has been the sole source provider of the cartridge bodies since 1991. The assessment concluded:

- Scranton AAP has the mission (and unique production equipment) to replenish metal parts for many large caliber munitions expended in a MRC (including the 120mm High Explosive, Smoke, and Illumination rounds, 105 and 155 mm artillery, and Navy 5 inch projectiles). These industrial capabilities must be retained to meet ammunition replenishment requirements. The workload generated by the procurement would help defray the Army's maintenance costs to retain Scranton's needed ammunition replenishment capabilities.

The Army restricted competition to the operator of the Scranton AAP, for mobilization base reasons, as permitted in FAR 6.302-3.

Industrial Assessment for Claymore Mines (December 1996)

The Claymore Mine System is a directional fragmentation antipersonnel device used to defend installations and outposts against infiltrating enemy infantry. The Claymore Mine System principally is used under the direct control of an operator, and therefore has been specifically excluded from the statutory ban on anti-personnel land mines. This assessment was designed to determine if the Department should take action to preserve the industrial capabilities required to produce the Claymore Mine System. The assessment concluded:

- Claymores are critical to the warfighter. They have been placed on the Army's Critical Items List.
- The Claymore Mine System is produced by a sole source, Mohawk Electrical Systems, Inc.
- The Department has sufficient Claymores in its war reserve inventory to meet projected training, MRC operational scenario, and replenishment requirements through 2003.
- The war reserve inventory is of acceptable quality.
 - ◊ As part of the Ammunition Stockpile Reliability Program, the Army has conducted 96 separate stockpile reliability tests on Claymores since 1983. There have been no indications of negative field reliability trends.
 - ◊ The Army recently conducted additional tests to verify stockpile reliability. A total of 45 Claymore Mine Systems, including the M57 firing device, were immersed in 9 inches of water for 24 hours, then tested. (Devices tested were manufactured in 1968, 1969, 1974, 1976, and 1977.) There were no test failures.
 - ◊ In October 1996, the Army interviewed field operators in South Korea to identify any Claymore reliability problems. In South Korea, systems are deployed for three months in wet and cold weather, then replaced with "fresh" Claymores. Previously deployed mines are used for training. The review in South Korea involved Claymores manufactured in 1975. There were no malfunctions.
- Future Department requirements are not yet defined, but are unlikely to include Claymores in their present configuration.
 - ◊ The Department is studying how to replace anti-personnel land mines on the battlefield. Changes in tactics and potential materiel solutions to the changed tactics will not be available before FY 99. Although Claymore-like systems would be considered, there likely would be significant command and control system changes, as a minimum.

- ◇ The Army likely would compete a performance specification to meet next generation requirements, not issue a sole source contract to Mohawk.
 - ◇ In addition to Mohawk Electrical Systems, there is a substantial industrial base that produces igniters and detonators for military and commercial uses.
- The Army is evaluating the use of a modified Claymore as part of its non-lethal initiative program. Research and development activities are funded in FY 97.
 - ◇ The research and development program may require a very limited procurement of Claymore components.
 - ◇ If the concept proves successful, engineering and manufacturing development activities would compete for future years funding.
 - ◇ This program could not result in new production of modified Claymores earlier than FY 00.
- The Department has no additional requirements for Claymore Mine Systems. Therefore, the Department need take no actions to procure additional Claymores, nor to preserve related industrial capabilities.

4.3 Navy

Industrial Assessment for Integrated Undersea Surveillance System (February 1995)

The Integrated Undersea Surveillance System (IUSS) provides surface and subsurface surveillance inputs to obtain decisive strategic and tactical advantage. The IUSS is composed of the Sound Surveillance System, the Fixed Distributed System, the Surveillance Towed Array Sensor (SURTASS), the SURTASS Low Frequency Active, and the Advanced Deployable System. The assessment focused on the five IUSS systems. It evaluated the prime contractors, key subcontractors, and various other activities and facilities which produce and support the IUSS program to determine if reduced defense procurements endangered essential defense industrial capabilities. The assessment concluded:

- The USNS Zeus represents a minimum core technology. It has the only capability to place SOSUS cables.
- Simplex Technologies Inc. is the only facility which manufactures, stores, and loads cables used by SOSUS.
- No other sole source conditions exist.
- Downsizing and consolidation will result in reduced competition.

- Production gaps could lead to cost and schedule increases. The program office will address these issues as/if they occur.
- No government action is required to preserve essential industrial capabilities.

Industrial Assessment for Naval Communications (February 1995)

Naval communications systems include satellite communications, submarine communications, ship and shore communications, information security systems, shipboard interior communications, and tactical data links. Major components within these systems include satellite communications terminals, antennas, transceivers, modems, power amplifiers, tracking converters, patching/switching equipment, and encryption/decryption devices. The assessment focused on the availability of essential production skills, facilities, and technologies for these systems and components. The assessment concluded:

- For information security systems, software upgrades will be used to solve emerging problems; demand for new hardware will decrease.
- The commercial market will be adequate and readily available to provide nearly all communications sector products.
- There is no commercial market for submarine antennas.
- Commercial production and foreign military sales (FMS) help sustain essential capabilities.
- There are no known sole sources and all companies are profitable.
- No government intervention is required to preserve essential industrial capabilities.

Industrial Assessment for Navy Command and Control (February 1995)

The assessment evaluated the extent to which Navy-developed Command and Control (C2) technology flowed to commercial industry, the extent to which commercial industry-developed C2 technology flowed to the Navy, and the degree of economic reliance between the two. The assessment focused on determining the minimum essential industrial capabilities required to meet the Navy's acquisition and maintenance requirements. The assessment concluded:

- Commercial sector dependence on Navy-developed technologies is minimal and unique Navy C2 applications do not require unique computer technology.
- New Navy C2 systems are postured to take advantage of commercial technology advancements.
- Navy C2 procurement requirements are extremely small when compared to the total market, and have minimal impact on commercial practices, production, and profitability.

- Commercial production and FMS help sustain essential capabilities.
- There are no known sole sources and all companies are profitable.
- No government intervention is required to preserve essential industrial capabilities.

Navy Industrial Base Vendor Assessment (February 1995)

The assessment expanded on a previous shipbuilding industrial assessment. It identified and evaluated vendors providing products needed to ensure the continuity of Naval operations in the present and projected defense environment. A total of 282 vendors were evaluated. The assessment concluded:

- Most submarine combat system, major non-nuclear propulsion system, and other "quiet" hull, machinery and equipment (HM&E) systems component vendors have been negatively impacted by reductions in Navy procurements and are experiencing financial problems.
- Most surface ship weapons & weapons direction system vendors are similarly affected.
- Selected surface ship HM&E systems vendors also are affected.
- However, current planned funding is adequate to sustain required industrial capabilities, and therefore no additional funds need be spent to sustain essential capabilities.

Industrial Base Survey, Sonar Rubber Domes/Windows (February 1995)

The assessment was designed to evaluate the feasibility of consolidating the production of submarine and surface ship sonar rubber domes and windows at a single Government-Owned and Contractor-Operated (GOCO) site. The assessment concluded:

- B.F. Goodrich Corporation produces Navy surface ship sonar windows. Hitco produces Navy submarine sonar domes. Both facilities are underutilized due to declining procurements.
- The key equipment required to produce sonar windows and domes are government-owned autoclaves.
- Consolidation at a single GOCO site would not provide sufficient business to overcome underutilization concerns.

The Navy made a lot purchase of sufficient surface ship sonar windows and submarine sonar domes to meet all planned requirements. Hitco has exited the submarine sonar dome

business. B.F. Goodrich is producing other items at its former surface ship sonar window facility.

Advanced Amphibious Assault Vehicle Industrial Base Assessment (June 1995)

The Advanced Amphibious Assault Vehicle (AAAV) is a self-deploying, high water speed, armored personnel carrier that will be the principal means of Marine Infantry mobility during ship-to-shore movement and land combat operations. The AAAV family of vehicles will consist of a personnel variant and a command and control variant. The AAAV is a replacement system for the current Amphibious Assault Vehicle, originally fielded in 1972. This assessment was performed by the U.S. Army Industrial Engineering Activity (IEA) to support the AAAV Program Milestone I decision. The Marines and IEA cooperated to maximize the use of data collected from the tracked combat vehicle industrial base which the Marines and Army share. The assessment focused on the two prime contractors competing for the program and their critical suppliers. Selected non-critical suppliers also were considered. Primary data sources included on-site and telephone interviews, Dun & Bradstreet reports, other tracked combat vehicle studies, journals, and periodicals. The assessment concluded:

- Companies in the tracked combat vehicle sector are facing a declining business base. U.S. companies are not major players in the current world tank market.
- Companies in the medium/light tracked vehicle sector also are facing a declining business base. However, U.S. firms have a leading position in this market.
- Most vendors produce a blend of military and commercial products in the same facility, with some using the same production lines and equipment.
- More than 40 percent of the sub-tier vendors visited are operating at less than 50 percent production capacity utilization. DoD business backlog at the sub-tier vendors has declined from 14.2 months in 1992 to 11.2 months in 1993, with a further decline to 10.5 months projected by 1996. Commercial business backlog at the sub-tier vendors is projected to decline from 7.3 months in 1992 to 6.8 months in 1996.
- Thirty-three of seventy-four sub-tier vendors had increased total sales, twenty-four had decreased total sales, and six had total sales at approximately historical levels. (Eleven vendors did not provide sales data or provided it for only one year.)
- Sixty-six percent of the sub-tier vendors had total sales of less than \$50 million. Fifty-one percent employ less than 200 people.
- Of the seventy-four vendors visited, sixty-eight were rated low risk. Three companies had a Dun & Bradstreet Supplier Evaluation Risk Score of 9, and merit the highest level of review.

- Ceramic armor availability poses a potential problem. Although the technology is mature, there may not be enough capacity to meet program requirements.
- No government intervention is warranted at this time. There are no extraordinary industrial base actions required. None of the sub-tier producers with potential problems are considered sole source producers. There is a high percentage of commonalty between the AAHV suppliers and other tracked vehicle/marine suppliers.

The AAHV received a favorable Milestone I decision in March 1995. General Dynamics Amphibious Systems was awarded the program definition and risk reduction contract in June 1996. (In May 1996, the IEA evaluated the ceramic armor production capability concerns identified above. That assessment is summarized next in this section.)

Advanced Amphibious Assault Vehicle Ceramic Armor Sector Study (May 1996)

Controlling vehicle weight is critical to the success of the AAHV program. A June 1995 industrial assessment for the AAHV program revealed a potential problem with industry's ability to meet projected AAHV ceramic armor requirements. This ceramic armor study was based on visits to the Army Research Laboratory, Alfred University, and ten ceramic armor sub-tier vendors. The assessment concluded:

- Coors, Carborundum, Ceradyne, and Cercom are the most likely candidates to produce ceramic armor
- Ceramic armor suppliers may require facility and capital equipment funding depending on the type of ceramic armor selected.
- No government intervention is warranted at this time to sustain essential industrial capabilities. Issues associated with ceramic armor will be re-evaluated after vendors are selected.

DDG 51 Acquisition Study Summary Report (August 1995)

The Navy undertook this study as background to the development of an acquisition strategy for the AEGIS DDG 51 class of destroyers that fit cost-effectively into its long-term shipbuilding requirements. The assessment considered shipbuilder capacities, capabilities, and affordable acquisition alternatives. The assessment's conclusions noted that down-selecting to a single shipbuilder would not be advantageous at this time. It would result in (1) potential loss of a major shipbuilder, (2) potential loss of competition in future surface shipbuilding programs, (3) increased risk to DDG Flight IIA (updated configuration from lead ship) design and production, (4) increased risk in delivering ships currently under contract.

Assessment of the Navy's Propeller Industrial Base and the Impact of Limiting Propeller Manufacture to U.S. Sources (Report to Congress, Defense Authorization Conference Report #104-450) (July 1996)

Congress had expressed concern about the Navy's ability to sustain a robust ship propeller repair and maintenance industrial capability. The assessment addressed the Navy's ability to maintain and modernize its fleet, and the impact of the two-year Congressional restriction to U.S. sources of the purchase of propellers over six feet in diameter. The assessment concluded:

- Industrial capabilities needed to repair Navy propellers are considered robust.
- The Navy prohibits non-U.S. development, manufacture, and repair of submarine propulsors and propellers for national security reasons. U. S. sources have manufactured nearly all Navy propellers since the mid 1980s. The Navy utilizes only one non-U.S. propeller manufacturer—Canada's Stone Marine. It has been awarded about 6 percent of current Navy orders.
- The Navy will continue to monitor propeller industrial capabilities.
- No actions are required to sustain essential industrial capabilities.

4.4 Air Force

F-22 Initial Production Readiness Review Industrial Capability Assessment (March 1995)

The primary purpose of the initial F-22 Production Readiness Review (PRR) was to determine if the F-22 contractors are prepared to produce the weapon system. The initial PRR Report was one of three assessments to be developed as part of continuous in-process PRR activity. This initial assessment was tied to the sub-tier supplier critical design reviews (CDRs). The second assessment will review production readiness progress from CDR to First Flight. The third will review progress subsequent to First Flight and will support the Low Rate Initial Production (LRIP) decision for Lot 1 full contract award. The assessment concluded:

- At the time of the PRR, there was a potential for some suppliers to exit the marketplace or stop production of certain items.

| <u>Supplier</u> | <u>Product</u> |
|-----------------|--------------------------|
| Quadrax | Thermoplastic IM8/8320 |
| Hexcel | Honeycomb core |
| SFS | Special technology seals |
| Fiberite | 977-3 epoxy prepreg |
| Cytec | 5250-4 BMI prepreg |

- F-22 suppliers are considering qualification of additional sources for these materials. Most suppliers indicated they have potential alternates, or plans to develop alternate sources when quantities are feasible to support them. These supplier issues are routine programmatic matters which are being addressed within program channels.

No industrial capabilities deficiencies were identified during the initial assessment. This assessment was the first in a series. Industrial capabilities will continue to be studied.

Radiation Hardening of Semiconductor Components (March 1995)

DoD's acquisition policies express a preference for commercial products and discourage reliance on military specifications. This assessment evaluated the impact of these policies on the availability of radiation hardened semiconductors. The assessment concluded:

- Satellites, electronic equipment, and equipment designed to survive the radiation from nuclear explosions generally require some degree of radiation hardening.
- Commercially available semiconductor components normally do not meet military radiation hardened requirements.
- Reliance on commercially available, non-hardened semiconductors could have quality, reliability, and performance implications which could put expensive equipment and personnel at risk.
- Absent military specifications, there are concerns about how quality, reliability and assured radiation hardened capabilities will be defined for replacement semiconductors.
- A Radiation Hardness Assurance Standard is required. This would help ensure that equipment remains reliable in harsh environments. This standard should be both cost effective and meet the military and aerospace requirements.

In December 1995, DoD completed an integrated assessment (summarized in Section 3.2.) to determine if there are, and will be, sufficient industrial and technological capabilities to meet DoD needs for radiation hardened integrated circuit production and new product advances.

C-17 Industrial Base Analysis (August 1995)

The Department requires major defense programs to evaluate industrial capabilities and related risks prior to each major milestone decision. As the C-17 program approached its full rate production decision point – entailing authorization for the purchase of 120 aircraft – the Air Force conducted an assessment to determine if there were any industrial base-related risks to long-term production. The assessment addressed McDonnell Douglas Aerospace (MDA) and its major/critical suppliers (of which 65 participated in a survey). The assessment focused on the

potential for qualifying alternate suppliers; capacity; potential bottlenecks; military business base; new manufacturing technology planned for use in production; foreign suppliers; financial viability; supplier risk management; MDA facilities, "off-loads to other sources," and improvement trends; the economic impact of the program; the best commercial/military practices pilot program; and planning for multi-year procurements. The assessment concluded:

- All C-17 suppliers potentially can be replaced with an alternate supplier.
- The C-17 supplier industrial base has the ability to expand to an annual production rate of 15 aircraft per year, or more if required. (The baseline production rate was 12 aircraft per year.)
- Several suppliers indicated that lead times were increasing for certain materials.
- Mergers and consolidations presented no adverse impact to the C-17 program.
- Several suppliers indicated that parts obsolescence was a growing problem (primarily in the electronics area).
- Four suppliers were identified as having past delivery problems. Problems with one supplier were resolved; the other three supplier problems were expected to be resolved in the near term.
- C-17 suppliers have an average of four other significant military production programs in-house, running concurrent with C-17 production. However, the C-17 program was assigned a DX industrial priority rating in February 1995. Since the vast majority of other military programs competing with C-17 production are DO rated, the risk of C-17 production being impacted by competing programs was considered to be very low.
- Many C-17 suppliers have either already modernized their manufacturing processes or plan to in the near future. Many other modernization projects have been proposed in connection with the on-going C-17 affordability program.
- At the time of the assessment the C-17 had 25 known foreign suppliers, of which one had experienced a delivery problem (the problem was expected to be resolved in the near term).
- All suppliers at the time of the assessment appeared to be financially viable.
- The C-17 program has had a history of off-loads (moving MDA production to new sources). This is an extension of the overall industrial base consolidation trend. At the time of the assessment two major off-loads had just been completed and others were being planned. Lessons learned from the completed off-loads were being applied to the ones in progress to mitigate risks to production.
- In the two years preceding the assessment, MDA made substantial manufacturing improvements. These improvements include a 53 percent reduction in rework and repair

costs in 1994, a 92 percent reduction of parts shortages in 1994, a 26 percent reduction in production span time from production aircraft P5 to P17, and early delivery of aircraft to the contract schedule.

- Many suppliers expressed a need for higher, more economical rates of production that a multi-year contract for C-17 procurement would provide.

The Air Force was authorized to proceed into full rate production and to procure 120 aircraft (in addition to the 40 aircraft previously approved). In 1996, Congress authorized a seven-year (multi-year) procurement.

Cadmium/Chromium Electroplating and Ion Beam Processing Suppliers (August 1995)

This assessment was designed to evaluate Ion Beam Processing (IBP) technologies applications and their implementation throughout North America's defense and commercial industrial bases. The assessment focused on specific electroplating and ion beam suppliers, and addressed IBP applications and implementation. It evaluated the state of the technology, and identified technical and socio-economic implementation considerations and potential dual-use applications of IBP technologies. The assessment concluded:

- Ion implantation is a mature and environmentally safe process. Ion implantation represents a niche market in the medical device industry.
- IBP technologies have not achieved wide acceptance for metal surface finishing applications in North America.
- IBP technologies have potentially high dual-use applicability.
- No government intervention is necessary to preserve essential industrial capabilities.

The Department has participated in several workshops exploring potential technology insertion projects that could benefit future DoD programs.

Joint STARS Industrial Base Assessment (March 1996)

This assessment was performed to support a Joint STARS full rate production decision. Twenty-five reviews were conducted with the prime contractor, subcontractors, suppliers, and vendors. The assessment focused on the Joint STARS system, contractor business base and manufacturing capabilities, critical suppliers, and environmental issues. The assessment concluded:

- The contractors supporting the program have the capacity and capability to meet Joint STARS program requirements.

- There are concerns about diminishing manufacturing sources, obsolescence, and problems associated with a low volume, stretched out acquisition plan. With the selection of the used Boeing 707 airframe, aging aircraft, specifically component and repair part availability, become a key issue.
- The Joint STARS contractors are complying with requirements to minimize and/or eliminate the use of environmentally unfriendly substances.
- There are no industrial capabilities issues that require intervention into the industrial base.

The identified programmatic issues will be addressed as part of the normal acquisition process. The Air Force was authorized to proceed with the production program.

Potential Risk to ACES II Ejection Seat Manufacturing Facilities (March 1996)

The ACES II ejection seat is manufactured in a dedicated McDonnell Douglas facility in Florida. Declining order quantities of new tactical combat aircraft may result in ACES II ejection seat production falling below the minimum level necessary to sustain non-recurring costs at the facility, and maintain current prices. The Air Force assessed a McDonnell Douglas proposal to modify planned production rates to maintain seat prices. The assessment concluded:

- The Air Force uses the ACES II ejection seat extensively. McDonnell Douglas is the sole domestic source of military aircraft ejection systems (including the ACES II). The US Navy acquires the majority of its ejection seats from Martin-Baker (UK).
- Planned F-22, F-15, and F-16 production requirements for the next five years are valid. (Both optimistic and conservative projections for foreign sales were included.)
- McDonnell Douglas proposed several alternatives, including adjusting contractually required delivery schedules and moving production to their St. Louis complex. McDonnell Douglas at no time proposed exiting the ejection seat market or ceasing production of ACES II systems.

The Air Force decided to take no action to preserve industrial capabilities or maintain current prices. The Air Force decided not to adjust ACES II ejection seat delivery schedules. McDonnell Douglas will, in its pricing, detail overhead costs tied to decreased production and, should relocation of the production line become necessary, those costs would be reflected in future contracts.

Industrial Capabilities Assessment of SPECO Corporation (April 1996)

This assessment was designed to determine if industrial capabilities possessed by SPECO Corporation were essential to defense and should be preserved. The assessment concluded:

- SPECO produces power transmissions, flight control actuators, and accessory drive systems. Its main capability is associated with the fabrication of gear components. It is a specialized machine shop with an in-house capability for heat treating, assembly, and test.
- SPECO is a sole source supplier for the E-2C, P-3, C-5, C-141, and B-1 aircraft. However, SPECO's volume of DoD work is relatively small and other companies—Curtiss-Wright, Sundstrand, Moog, and HR Textron—have sufficiently similar capabilities to support reprourement requirements.
- Reprourement from alternate suppliers could result in cost and schedule impacts to aircraft programs.

The Air Force determined that no special actions should be taken to preserve SPECO. Program offices were alerted to the potential closure of SPECO in order to mitigate programmatic (cost and schedule) impacts. SPECO closed in May 1996.

Lower-Tier Subcontractors for the F-15 (May 1996)

The F-15 currently is produced primarily for foreign military sales. Limited quantities are being produced for the U.S. Air Force. This assessment was designed to determine if declining, and eventually ending, F-15 sales would adversely impact the supplier base for tactical combat aircraft. The assessment concluded:

- Reductions in planned production of F-15 aircraft do not represent a significant threat to the tactical combat aircraft supplier base.
 - ◊ The supplier base already has undergone significant restructuring due to declines in both defense and commercial aviation purchases.
 - ◊ Supplier programs among aerospace prime contractors have targeted the supplier base for significant gains in quality and affordability through selecting "best value" suppliers for long-term contractual/business partnerships at the expense of less aggressive performers.
 - ◊ Overall quality and affordability trends are positive.
- For the Air Force, this means a world class aviation supplier base is available for both the F-15 and future systems (F-22, Joint Strike Fighter). In some cases, items unique to military aircraft (ejection seats, large transparencies, chaff/flares) may require risk mitigation efforts in the future.

The Air Force determined that no actions were necessary to preserve essential defense industrial capabilities.

Specialty Aerospace Materials Which May Be Applicable for the F-22 Program (July 1996)

This assessment was designed to determine if the Air Force should invest in new manufacturing processes to shorten lead times and lower prices for specialty metals structural applications, and to recommend corrective actions, as necessary. Industry representatives suggested the Air Force was using old metals technology in current aircraft acquisitions (F-22). The assessment considered Air Force specialty metals needs and related industrial capabilities problems. The assessment concluded:

- F-22 System Program Office representatives indicated that consideration of new (not currently available) alloys would have jeopardized time schedules and produced unwarranted technical risks. However, three specialty metals have their initial aerospace application on the F-22.
- Wright Laboratory's Materials Directorate is pursuing new and emerging metals and processes for application on the latest systems, and for older aircraft. However, although the Wright Laboratory Manufacturing Technology Directorate has numerous metals projects, only one pertains to specialty metals.
- The Air Force places a higher priority on development of materials for use in propulsion systems as opposed to structural applications. The Air Force often updates turbine engines before aircraft wings and structures are replaced.
- For the nine key companies which manufacture or produce either nickel-based superalloys, beryllium, or titanium products:
 - ◊ Companies generally are financially sound.
 - ◊ Sales and profits are increasing.
 - ◊ DoD is not the sole customer. Commercial demand is increasing.
 - ◊ Some companies are expanding (for example, Brush Wellman is investing \$110M to cut delivery lead times)

The Air Force decided that, with higher priorities elsewhere and a constrained budget, direct investment to improve specialty metal manufacturing processes was not feasible.

Satellite Subcontractor Survey (August 1996)

This survey was performed to characterize those satellite subcontractors which have indicated they may exit the military satellite business. The assessment concluded:

- Of the identified problematic suppliers, 32 percent are either out of business or will not produce products for DoD satellites, 17 percent indicated they may exit the business within twenty-four months, and 50 percent indicated they will continue to support DoD satellite business for five years and more.
- The impact of commercial business practices on DoD space application requirements (for example, high reliability and radiation hardened components) is yet to be determined. However, satellite suppliers generally are turning to commercial business and commercial business practices.
 - ◊ Military sales are not sufficiently profitable to counterbalance increased fiscal controls, production restrictions, testing burdens, and small order size.
 - ◊ Suppliers state that, in the future, they may decline to respond to federal contracts.
 - ◊ There are an increasing number of sole and single source suppliers, many of whom may decline to perform added testing or supply special handling to meet military requirements.
- Suppliers that are continuing to pursue future military business advise that they increasingly intend to prioritize orders on the basis of profitability.
- A properly developed parts, components, and subsystems adaptability program would facilitate the use of commercial and military non-developmental parts in future military system and spacecraft design.

No actions were taken to preserve essential capabilities. The Air Force Space and Missile Center is evaluating the size and potential impact of these trends and is pursuing methods to better utilize commercial and military non-developmental products which meet DoD application requirements in military satellites. Specific parts and subcontractor problems are being addressed within programmatic channels.

4.5 Defense Logistics Agency (DLA)

Meal, Ready-to-Eat Investment (Automation) Assessment (December 1995)

The DoD's Meal, Ready-to-Eat (MRE) Program acquires combat rations for use in the field. The MRE Program consists of 18 menus, soon to be expanded to 24 menus. The menu changes will include replacing casserole items with whole muscle meat items (for example, ham

slices and chicken breasts). This assessment evaluated the extent to which industry production equipment, configured to produce casserole-type items, will be able to efficiently produce muscle meat entrees at the accelerated production levels required to meet contingency requirements. The assessment concluded:

- DoD already has provided horizontal form, fill, and seal (HFFS) machines to those MRE suppliers ("retorters") which process raw food ingredients into entrees.
- Robotic systems augmenting the HFFS machines would increase production capabilities to better meet DoD requirements. Benefits would include (1) faster throughput for muscle meat retort operations and reduced inventory levels required to meet contingency requirements, (2) reduced unit cost for muscle meat entrees, and (3) reduced quality problems since manual handling of the food product is reduced.

DLA is considering programming \$2.25 million in the FY 98-03 Program Objectives Memorandum (POM) to purchase six fully automatic eight nozzle liquid piston fillers and twelve Adept "Pack One" robotic arms in order to better meet peacetime and contingency MRE production requirements.

Industrial Capability Assessment for Nerve Agent Antidotes in Autoinjectors (April 1996)

Nerve Agent Antidotes (NAA) in autoinjectors are military-unique items designed for rapid self-administration through clothing upon exposure to nerve agents. NAA in autoinjectors is contained in a "Mark I" kit composed of an Atropine and a Pralidoxime Chloride injection contained within separate autoinjectors, held together by a clip at the safety caps. The antidotes, autoinjectors, and manufacturing processes must be approved by the U.S. Food and Drug Administration (FDA). This assessment focused on determining if there were sufficient industrial capabilities to meet DoD NAA in autoinjectors requirements. The assessment concluded:

- Although peacetime requirements are low, NAA in autoinjectors must be available quickly, in large quantities, in the event of a military contingency.
- Title 10 U.S.C. 2534 restricts the purchase of chemical weapons antidotes contained in automatic injectors, or the components for such injectors, to those manufactured in the U.S.
- Survival Technology Inc. (STI), a domestic firm, is the only FDA-approved manufacturer of NAA autoinjectors.
- Quantities required to meet mobilization requirements greatly exceed peacetime needs.
- STI's ability to meet DoD mobilization requirements in the early stages of a contingency is limited by a four month lead time to obtain required autoinjector components and drugs.

- The Army is developing an alternative to the current NAA in autoinjectors, expected to be available within the next three to six years.

DLA awarded STI a restricted competition Industrial Base Maintenance Contract (\$6.26 million for one year, with options for two additional years) to sustain its sole source FDA-approved manufacturing facility. DLA restricted competition to STI for mobilization base reasons as permitted in FAR 6.302-3. Additionally, DLA purchased sufficient components to produce 368,971 Atropine and 380,637 Pralidoxime Chloride autoinjectors. The components are stored and rotated by STI. This purchase, at a cost of \$1.89 million, enables STI to begin production immediately when required. Component stock levels were based on potential risk and funds availability.

Pre-stocking these components eliminates the need to buy and stock finished products, which have a specific shelf life. It also reduces, but does not totally eliminate, shortfalls in meeting projected mobilization requirements. DLA reevaluates these decisions annually.

Industrial Capability Assessment for Diazepam Autoinjector Components (April 1996)

Diazepam autoinjectors are military-unique items designed for use on the battlefield by non-medical personnel to control convulsions caused by exposure to nerve agents. The antidote, autoinjector, and manufacturing processes must be approved by the U.S. Food and Drug Administration (FDA). This assessment focused on determining if there were sufficient industrial capabilities to meet DoD Diazepam autoinjector requirements. The assessment concluded:

- Although peacetime requirements are low, Diazepam autoinjectors must be available quickly, in large quantities, in the event of a military contingency.
- Title 10 U.S.C. 2534 restricts the purchase of chemical weapons antidotes contained in automatic injectors, or the components for such injectors, to those manufactured in the U.S.
- Survival Technology Inc. (STI), a domestic firm, is the only FDA-approved manufacturer of Diazepam autoinjectors. The Diazepam autoinjector is very similar to that used for Pralidoxime Chloride.
- Quantities required to meet mobilization requirements greatly exceed peacetime needs.
- STI's ability to meet DoD mobilization requirements in the early stages of a contingency is limited by a four month lead time to obtain required components.

As stated earlier, DLA awarded STI a restricted competition Industrial Base Maintenance Contract to sustain its sole source FDA-approved manufacturing facility for NAA in autoinjectors. Diazepam autoinjectors are included in the same contract. Additionally, DLA purchased sufficient components to produce 490,160 Diazepam autoinjectors. The components

are stored and rotated by STI. This purchase, at a cost of \$1.53 million, enables STI to begin production immediately when required. Component stock levels were based on potential risk and funds availability.

Pre-stocking these components eliminates the need to buy and stock finished products, which have a specific shelf life. It also reduces, but does not totally eliminate, shortfalls in meeting projected mobilization requirements. DLA reevaluates these decisions annually.

Chemical Protective Gloves (April 1996)

Chemical protective gloves are an integral part of the chemical-protective ensemble used to protect troops from chemical and biological attack. The assessment was designed to determine if essential industrial capabilities would be lost in the absence of DoD peacetime procurements. The assessment concluded:

- These chemical protective gloves are military-unique. Butyl rubber is the most cost-effective material capable of meeting threat and environmental requirements. Commercial glove manufacturers do not use butyl rubber because it contaminates their commercial manufacturing processes.
- Two companies, Siebe North Hand Protection and Guardian, currently manufacture the gloves. Both are required to ensure there is sufficient production capacity meet planned Major Regional Contingency (MRC) replenishment requirements.
- The gloves have a shelf life of five years.
- There is no current peacetime production requirement. Manufacture of the next generation glove, part of the Joint Services Lightweight Integrated Suit Technology program, has been delayed. Absent peacetime production, the plants will be dismantled.
- Initial testing on the next generation glove indicates it does not meet requirements for military pilots.
- Costs to rebuild/restart production lines would be approximately \$22 million per firm and would take two years.
- An Industrial Base Maintenance Contract would sustain essential industrial capabilities, permitting new production start up within four months.

DLA awarded both contractors restricted competition Industrial Base Maintenance Contracts (costing \$2.2 million annually per firm) to preserve the industrial capabilities required to manufacture chemical protective gloves. The contracts run through April 1997, with an option for one additional year. DLA reevaluates these decisions annually.

Tray Pack Equipment/Maintenance (May 1996)

This assessment was designed to determine if DoD needed to continue providing government furnished equipment (GFE) to augment production capabilities for the half-size steam table tray can. The GFE in question is valued at \$4 million and consists of six military-unique tray pack can seamers, and fifteen rotary pressure cookers to sterilize the food. The assessment concluded:

- Absent the GFE, industrial capabilities are not sufficient to meet DoD's contingency requirements for tray packs.
- Contingency production lead times would be reduced from three months to 4-6 weeks if the GFE was made available for peacetime production. Additionally, the GFE increases production capacity and reduces the need for large inventories of finished components.
- Storage and maintenance contracts will ensure the GFE is maintained in a "ready" status.

DLA awarded three storage and maintenance contracts for the GFE in FY 96, at a total cost of \$28,600.

Tray Pack Ration Readiness Investment Assessment (May 1996)

Tray pack rations are a member of the family of DoD operational rations. The components are thermally processed, shelf-stable foods, packaged in hermetically sealed, half steam table-size metal containers. DoD contingency requirements for tray pack rations greatly exceed peacetime requirements. The assessment compared current industrial capabilities to those required to meet contingency requirements. The assessment concluded:

- Peacetime quantities are insufficient for continuous production. Prime and subtier suppliers periodically produce sufficient quantities for peacetime requirements, and produce other products in the interim.
- The availability of tray pack cans and lids in the early stages of a contingency is the limiting factor in increasing production to meet contingency requirements. Due to low peacetime requirements, the manufacturer maintains only limited quantities of raw materials in stock reserve. The lead time to supply tray pack cans to the food processors is eight weeks, including six weeks to obtain raw materials.
- A safety stock of tray cans and lids, rotated through peacetime production, would reduce industry "ramp up" time to meet DoD contingency requirements.

DLA has programmed \$2.9 million in the FY 98-03 Program Objectives Memorandum (POM) to purchase a safety stock of approximately 1.8 million tray pack cans and lids. This

decision is reevaluated annually. The U.S. Army's Soldiers Systems Command is developing an alternative container for group feeding, which may be available in FY 98. If successful, this would obviate the need for tray pack cans and lids.

Folding Aluminum Cot (May 1996)

The folding aluminum cot is a collapsible bed with folding legs attached to a frame and a cover. DOD uses folding cots to provide beds for soldiers located in rear echelon combat service support bases. The cots also are used to support humanitarian and civilian emergency relief missions. This item is not commercially available. Commercial cots are made of thin tubular aluminum, with "U-shaped" legs. To meet rough handling requirements, DoD cots are made from heavy gauge aluminum bar, with crossed legs. This assessment focused on determining if there were sufficient industrial capabilities to meet DoD folding aluminum cot contingency requirements. The assessment concluded:

- Reyes Industries has been the sole producer of the cot since 1991. Peacetime requirements are too small to justify multiple production sources.
- Peacetime production does not justify sufficient production capacity to meet contingency surge requirements. Historical records indicate surge requirements occurring in the first month range from 30,000 to 90,000 cots.
- During deployment and national emergencies, requisitions quickly exhaust inventories and contingency reserves. Production lead-time for the folding cot depends on the availability of extruded aluminum and canvas. Lead-times for these items are eight and twelve weeks, respectively. Once materials are on hand, actual manufacturing takes three to four weeks.
- Prepositioning raw materials at the contractor's plant can reduce the lead-time to obtain the extruded aluminum and canvas, but is not sufficient to meet operational requirements during the first thirty days of a conflict.

DLA purchased 32,110 folding cots at a cost of \$1.4 million. The cots are stored at the contractor's facility (storage fees are \$5500 per year) and are available for shipment immediately. This action allows the contractor to supply end items immediately to meet the requests expected from the Services during the first thirty days of the conflict (shipping up to 10,000 Folding Cots within 24 hours). Additionally, DLA and the Army are evaluating both the DoD specification and commercially available cots to determine if the military specification can be relaxed.

Battle Dress Overgarment (BDO) Liner Fabric (September 1996)

The BDO liner fabric is an integral part of the chemical-protective ensemble used to protect troops from chemical and biological attack. The liner is a charcoal-slurry-impregnated fabric. The assessment was designed to determine if essential industrial capabilities required to

meet MRC replenishment requirements would be lost in the absence of DoD peacetime procurements. The assessment concluded:

- Duro Industries is the sole source contractor for the liner.
- There is no current peacetime production requirement. However, the DoD must maintain production capability to meet MRC replenishment requirements.
- Rebuild/restart would cost approximately \$4 million and take over one year if production is discontinued and the facility is dismantled.
- An Industrial Base Maintenance Contract would sustain essential industrial capabilities, permitting replenishment within required timeframes.

DLA awarded the contractor a restricted competition Industrial Base Maintenance Contract (costing \$1.76 million annually) to preserve the industrial capabilities required to manufacture the BDO liner fabric.

Inflator Assembly for MK-1 Vest (August 1996)

The inflator assembly for the MK-1 life vest is a critical component obtained from a sole source. This assessment was designed to determine if there are sufficient industrial capabilities to meet peacetime and contingency inflator assembly production requirements. The assessment concluded:

- The inflator assembly is unique to Navy applications. Navy personnel wear an uninflated life vest to provide maximum freedom of movement while performing deck operation duties. The inflator assembly is designed to inflate the vest in a life threatening situation even if the wearer of the vest is unconscious.
- Current production levels are 1000 per month. Additionally, approximately 4000 assemblies are on back order to meet current needs. Additional tooling is required to increase production capacity to meet peacetime requirements—the back orders could be worked off by July 1997.
- The wartime surge requirement is 2,500 units per month, significantly greater than peacetime requirements. The additional tooling would increase the monthly production capacity from 1000 per month to 2,500 per month, meeting surge production requirements.

DLA modified the contract to provide \$98,800 to purchase four additional cavity die machines. This equipment will be considered government property. It will enable the contractor to meet both peacetime and projected contingency production requirements.

Heavy Expanded Mobility Tactical Truck Filter Elements (August 1996)

This assessment was designed to determine if industrial capabilities were sufficient to meet Heavy Expanded Mobility Tactical Truck Filter Element (HEMTT) peacetime and contingency production requirements. The assessment concluded:

- The filter elements have a shelf life of 24 months and are supplied by a sole source contractor.
- Production lead times are 60-130 days and AArmy surge requirements are 33,000 filters in the first 30 days of a conflict.

DLA awarded a \$384,800 rotational stock contract to the sole source filter element contractor. The contract requires the company to maintain an inventory of 40,000 filters dedicated to HEMTT surge requirements, reducing the lead time to 3 days.

Saratoga Suit Liner Fabric (September 1996)

The Saratoga suit is part of a new generation of chemical-protective apparel. It is lighter and less cumbersome than the BDO (slurry) suit. The Saratoga suit liner uses a carbon sphere technology process which does not generate the high levels of airborne dust associated with BDO (slurry) suit production. This assessment was designed to determine if there are sufficient industrial capabilities to meet Saratoga suit liner fabric MRC replenishment production requirements. The assessment concluded:

- The Saratoga suit liner fabric is produced by a sole source foreign manufacturer. The manufacturing process is proprietary and the sole source is unwilling to license the technology to other producers. It is attempting to expand its production.
- Replenishment requirements can be met only if the fabric is stockpiled at the "cut and sew" prime contractor.

DLA awarded a \$2.56 million with the overseas supplier to permit the liner fabric to be stored at the U.S.-located prime contractor's facility.

Industrial Capability Assessment for Short Shelf-Life Pharmaceutical Items (December 1996)

DoD uses stock rotation contracts with manufacturers with a single line item which the Department has determined is critical to its medical mission in a contingency situation, and for which required quantities are not normally available within the required time. Under the stock rotation concept, DoD purchases a specified inventory quantity which will remain with the manufacturer and is rotated as part of the manufacturer's drug inventory. The inventory is used

as required to quickly meet Department peacetime, but especially contingency, requirements. There is a nominal annual rotational fee for each contract. This assessment was designed to identify critical short shelf-life pharmaceutical items for which DoD would benefit if included in such contracts (in effect, those medical items immediately required to save or sustain life). The assessment concluded:

- The healthcare industry has moved to a "just in time" inventory philosophy for both raw material and finished goods.
- There are large war reserve inventory requirements for many medical items, especially in the early phase of a contingency. Most medical stock items have a normal production lead time of 120 days. This does not meet operational requirements.
- Stock rotation would enable DLA to meet large initial product demands in a cost-effective manner and avoid losses due to shelf-life expiration of items in storage.

In FY 96, DLA awarded five stock rotation contracts with an inventory value of approximately \$3.6 million. (In FY 95, DLA awarded six medical item stock rotation contracts purchasing inventory with a total value of \$11.7 million. Since 1987, DLA has entered into fifteen such contracts, purchasing inventory valued at \$16.7 million. The annual rotational fees for these contracts total \$48,700.)

5. Conclusions

Chapter 148, title 10 of the United States Code, establishes Congressional policy designed to ensure the national industrial and technological base will continue to be able to meet the Nation's national security requirements. The Department has established policies and procedures, performed analyses, and taken the actions necessary to:

- Leverage the capabilities and competitive pressures of the commercial marketplace.
- Identify and evaluate those industrial and technological capabilities needed to meet current and future defense requirements.
- When necessary, determine the most cost- and mission-effective actions that the Department should take to preserve endangered essential capabilities.
- Respond appropriately within the Department's regular budget, acquisition, and logistics processes.

In 1995 and 1996, the Department and its Components performed a series of sector, subsector, commodity, and product assessments. Generally, these assessments led to similar conclusions. Although the defense industry is experiencing significant reductions and downsizing, DoD found very few cases where essential capabilities are endangered, even given low production rates. In those few cases, the Department is taking steps to assure essential capabilities will continue to be available.

In some cases, DoD has taken action to sustain key sub-tier industrial capabilities required to meet current or projected peacetime defense requirements. For the most part, however, DoD intervention actions have been limited to preserving selected capabilities for which DoD peacetime requirements are limited, and projected military contingency requirements are significantly larger. In such cases, DoD has:

- Restricted competition in a solicitation, for mobilization base reasons, to domestic sources, and/or
- Acquired and maintained facilities, equipment, or components needed to meet projected military contingency (surge and replenishment) requirements.

The Department will continue to focus in a timely and cost-effective manner on those industrial capabilities which are essential to defense, at risk, and which may require special action to be sustained.

Appendix A

DoD Directive 5000.60, Defense Industrial Capabilities



Department of Defense DIRECTIVE

April 25, 1996
NUMBER 5000.60

SUBJECT: Defense Industrial Capabilities Assessments

ASD(ES)

- References:
- (a) DoD 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs," March 15, 1996, authorized by DoD Directive 5000.1, March 15, 1996
 - (b) DoD 5000.60-H, "Assessing Defense Industrial Capabilities," April 25, 1996, authorized by this Directive
 - (c) DoD 5025.1-M, "DoD Directives System Procedures," August 1994, authorized by DoD Directive 5025.1, June 24, 1994

A. PURPOSE

This Directive, under reference (a):

1. Establishes policy and assigns responsibilities for assessing defense industrial capabilities. The purpose of the assessment is to ensure that the industrial capabilities needed to meet current and future national security requirements are available and affordable.
2. Provides guidelines for DoD managers to use in determining:
 - a. Whether a specific industrial capability is required to meet DoD needs, is truly unique, and is truly endangered; and, if so,
 - b. What, if any, action the Department of Defense should take to ensure the continued availability of the capability.
3. Authorizes the publication of reference (b) in accordance with reference (c).

B. APPLICABILITY AND SCOPE

This Directive applies to:

1. The Office of the Secretary of Defense (OSD), the Military Departments, the Chairman of the Joint Chiefs of Staff, the Unified Combatant Commands, the Inspector General of the Department of Defense, the Defense Agencies, and the DoD Field Activities (hereafter referred to collectively as "the DoD Components").
2. All goods and services procured by the Department of Defense. The DoD Components shall assess industrial capabilities on a case-by-case basis when there is a known or projected problem. The guidelines in this Directive shall be used when a DoD acquisition manager, inventory control point manager, or other buyer determines there is a substantial risk that an industrial capability needed to support DoD programs or products may be lost. For capabilities used by more than one DoD program or product, the DoD Components should coordinate analyses and related decisions with other affected DoD Components and programs.

C. DEFINITIONS

1. Defense Industrial Capabilities. The skills and knowledge, processes, facilities, and equipment needed to design, develop, manufacture, repair, and support DoD products. Defense industrial capabilities include private and public industrial activities.

2. Industrial Capability Analysis Summary Report. A report summarizing the results of an industrial capability analysis; it recommends an action or investment and addresses cost, schedule, effects on performance, and pertinent qualitative considerations. It defines how and when the action would be incorporated into the budget and, if possible, identifies budget offsets.

D. POLICY

1. Basis for Action. An action shall not be taken nor an investment be made to preserve an industrial capability unless it is the most cost- and time-effective alternative to meeting national security requirements. The DoD Components shall base any such determination on objective analysis.

2. Industrial Capabilities Analyses. An analysis shall be performed to address the criteria outlined in enclosure 1. DoD 5000.60-H (reference (b)) provides guidance on how to perform this analysis. Managers with the best knowledge of the product or service of concern should perform the analysis. The analysis must address the following questions in a formal, quantitative, and documented approach:

a. Is there a valid national security requirement for the product or service of concern to meet current or future military missions, readiness, or sustainment?

b. What industrial capabilities are essential to making the product or service?

c. Is any capability truly unique? Is any capability truly endangered?

d. Have the cost, risk, and benefit of all feasible alternatives been evaluated?

e. Is the recommended action the most cost- and mission-effective solution?

3. Industrial Capabilities Investment Decision Authorities. Decisions to make investments to sustain industrial capabilities shall be approved by the appropriate authority, as follows:

a. The Under Secretary of Defense for Acquisition and Technology (USD(A&T)) shall approve any proposed action or investment to preserve a capability with an anticipated cost of \$10 million or more annually. The DoD Components shall first coordinate such proposals with the Assistant Secretary of Defense for Economic Security (ASD(ES)) who shall coordinate DoD Component-proposed investments with appropriate OSD staff elements prior to USD(A&T) approval. The DoD Component proposal shall be accompanied by an industrial capability analysis summary report.

b. For Acquisition Category (ACAT) programs, the Defense Acquisition Executive (DAE) or the DoD Component Acquisition Executive (CAE), under the authority of the DoD Component head, must approve any proposed action or investment to preserve a capability with an anticipated cost of less than \$10 million annually. The proposal shall be accompanied by an

industrial capability analysis summary report, with information copies to the ASD(ES) on an annual basis. DoD 5000.2-R (reference (a)) defines CAE and DAE programs.

c. For all other items or programs (that is, non-ACAT programs), the Head of Contracting Activity, under the authority of the DoD Component Head to which the item or program is assigned, shall approve decisions for investments of less than \$10 million annually. The decision shall be accompanied by an industrial capability analysis summary report, with information copies to the ASD(ES) on an annual basis.

d. If the DoD Components recommend action or investment for more than one year, they must revalidate the analysis each year to ensure DoD action is still needed.

E. RESPONSIBILITIES

1. The Under Secretary of Defense for Acquisition and Technology shall:

a. Make policy and investment decisions on defense industrial capabilities and approve any actions or investments of \$10 million or more annually proposed by the DoD Components to preserve industrial capability.

b. Ensure that the ASD(ES) provides DoD policy, guidance, oversight, and technical assistance on assessing or investing in defense industrial capabilities. The ASD(ES) shall coordinate on any actions or investments of \$10 million or more annually proposed by the DoD Components to preserve industrial capability and coordinate DoD Component-proposed investments with appropriate OSD staff elements before USD(A&T) approval.

c. Ensure that, for ACAT programs, the DAE or DoD CAE, under the authority of the respective DoD Component Head, approves any actions or investments of less than \$10 million annually to preserve a capability. For all other items or programs (that is, non-ACAT programs), the Head of Contracting Activity, under the authority of the DoD Component Head to which the item or program is assigned, shall approve decisions for investments of less than \$10 million annually.

2. The Heads of the DoD Components shall implement the policies and analyses required by this Directive and shall promulgate training and other implementation techniques as needed. The DoD Components shall coordinate industrial capability analyses and any associated action or investment decision across programs and with other affected DoD Components. The DoD Components shall provide industrial capability analysis summary reports to the ASD(ES) and the investment decision authorities.

F. EFFECTIVE DATE

This Directive is effective immediately. DOD 5000.60-H (reference (b)) constitutes implementation of this Directive.

/signed/

John P. White
Deputy Secretary of Defense

Enclosure
Industrial Capability Assessment Criteria

INDUSTRIAL CAPABILITY ASSESSMENT CRITERIA

Before taking action or making an investment to preserve an industrial capability, the DoD Components must validate each of the following criteria for their product or service of concern:

1. The problem warrants an industrial capability analysis; it is not a routine vendor management issue.
2. There is a valid national security requirement for the product or service to meet military missions, readiness, or sustainment needs or that the capability is needed to support next-generation product development or manufacture.
3. The capability is truly unique. A specific industrial capability, vital to providing the product or service in question, is truly unique. Verify that capability exists only in one product or product line, and is so dissimilar from any other defense or commercial industrial capability that its loss would prohibit the Department of Defense from obtaining a defense product or service.
4. The unique capability will actually be lost. Validate that one of the following conditions exists:
 - a. The only supplier is exiting because the product line is not sufficiently profitable.
 - b. The only supplier is exiting because the business unit is no longer financially viable.
 - c. The industrial capability is technically so complex and sensitive, such an intricate combination of science and art, that any interruption or reduction in the activity will cause the capability to be effectively lost. (Answers must be based on performing a financial analysis or technical analysis, as indicated.)
5. The cost, risk, benefit, and legal authority of all feasible alternatives have been evaluated. The following alternatives have been assessed:
 - a. Taking no action.
 - b. Using a foreign source of supply.
 - c. Using an existing substitute product or capability, modifying an existing substitute product or capability, or modifying the DoD performance requirement so that a substitute product can be used.
 - d. Making a buy-out to meet future DoD needs; that is, buying a sufficient quantity to meet future needs and storing the product.
 - e. Applying a new technology approach to replace either the product or the capability currently used to meet DoD needs.
 - f. Investing in "smart shutdown" actions; that is, purposefully preserving certain elements (equipment, skills' inventories, data, etc.) essential to regenerating a product or service, while allowing the current development or production activities to cease.

g. Investing in an acquisition action to preserve the capability by preserving development or manufacturing activity for the current product.

h. Relieving or adding specific contract, policy, procurement, or export conditions that are hampering DoD access to a wider set of suppliers, or hampering endangered suppliers from potentially improved business opportunities.

6. The recommended action is the most cost and mission effective solution to ensuring that, based on the analysis, the Department of Defense can meet its mission.

7. DoD Component budget dollars and legal authority needed to make this investment have been identified.